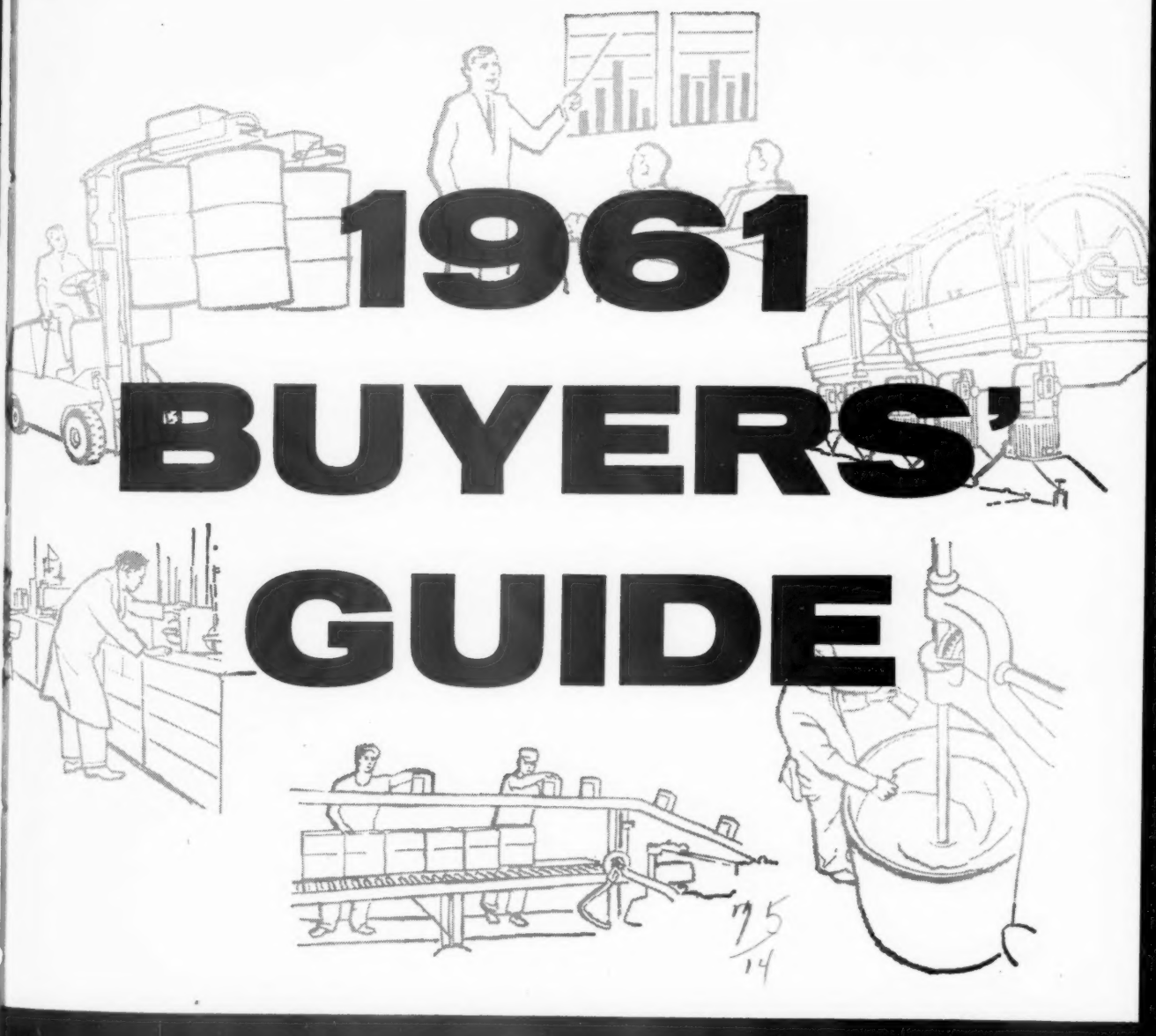
PVP



1961 BUYERS' GUIDE

NINTH ANNUAL EDITION

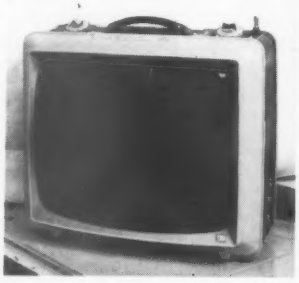
PVP

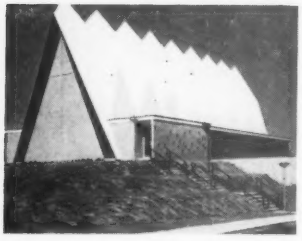
BAKELITE® COATING RESINS

Here for your ready reference is a complete list of the BAKELITE Coatings Resins currently available. For further information contact your Union Carbide technical representative or write to: Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York. In Canada: Union Carbide Canada Ltd., Toronto 12.

VINYL BAKELITE VINYL RESINS for surface coatings are tasteless and odorless. They are tough and highly water and weather resistant. Such coatings can be applied to metal, paper, cloth, wood, and masonry.

The special vinyl dispersion coating applied to these deluxe portable TV cabinets has brought important savings to Admiral Corporation, Chicago. In addition to simplifying fabrication, the simulated morocco-leather finish has helped increase sales through greater customer appeal.





Solution coatings based on BAKELITE vinyl resins such as this pure white roof coating on the First Congregational Church in North St. Louis provide the weatherability, adhesion, and beauty required for architectural applications.

VINYL CHLORIDE-ACETATE RESINS FOR SOLUTION COATINGS

VYLF . . . . .Blend with VYHH to increase solids, gloss and build. Lowers flexibility and softening range.

VYHH . . . .For general coatings which require little or no plasticizer.

VMCH . . . .Use alone or blend with other vinyl chloride-acetate resins for air-dry and low-bake adhesion. Reacts with basic pigments, resins, etc.

VAGH . . . .Compatible with wide range of other coating materials, including some alkyds. Air-dry adhesion to most coating vehicles.

VYNS . . . .Intermediate properties of this group as regards solubility, plasticizer tolerance, heat sealability.

VYNW-5 . .Can be highly plasticized to give tough elastic coating, nontacky even at 225°F.

VINYL CHLORIDE RESINS FOR DISPERSION COATINGS

QYNV . . . .Readily dispersed in plasticizers by "stirring." Fuses at 350°F.

QXKV-2 . .New "stir-in" type resin for plastisol and high-solids organosol dip and roller coatings. High structure at low shear rates, rapid gelatine rates, good viscosity and heat stability.

VINYL ACETATE RESINS

AYAC, AYAA, AYAF, AYAT . . .Water-white, odorless, tasteless, safe for foods. Heat-seal readily. Grease resistance and non-support of bacteria useful in food packaging. Block point raised by small amounts of waxes or n/c. Widely compatible. Hot melts. Good heat and light stability. AYAT used as adhesive for manufacture of paper hot drink containers. Resins higher in molecular weight than AYAT have only slightly higher softening point. AYAC flows at 200°F.

VINYL BUTYRAL RESINS

XYHL, XYSG . . .Strongly adhesive; excellent resistance to sunlight. Solvent water resistance and softening temperature increased by reacting with drying oils. BAKELITE phenolic resins, vulcanizing agents, etc. Increase toughness, flexibility and adhesion of thermosetting materials. Compatible with n/c. shellac, castor oils, etc. Used in metal "wash primers."

EPOXY BAKELITE EPOXY RESINS are made into air-dry and baking coatings of excellent adhesion, chemical resistance, and impact resistance. Uses include finishes for molded phenolic articles, can coating, and floor varnishes.

Epoxy coatings for low-cost phenolic molded parts have excellent adhesion, resistance to moisture, water, food acids, oils, and detergents. The handle, base, and cap top of this S. W. Farber coffee maker were all finished with a BAKELITE epoxy resin-based color coating.

EPOXY RESINS AND CURING AGENTS

ERL-2795 Low viscosity liquid resin. Good handling characteristics and performance in room temperature applications. Good solvent resistance. Designed to be reacted with amine-containing curing agents. Forms trowelling and spray-type coatings for floors, inclined surfaces, etc.

ERL-2774 Medium viscosity liquid resin. Good handling and performance in room temperature applications. Designed to be reacted with amine-con-

taining curing agents. Forms trowelling-type and spray-type coatings for floors, inclined surfaces, etc. Can be esterfied with bisphenol-A and fatty acids to make air-dry or baked coatings. Used in can coatings and floor varnishes.

ERL-2793 Curing agent for ERL-2774, ERL-2795. Pot life at room temperature. 15-20 min. for ERL-2774; 20-25 min. for ERL-2795.

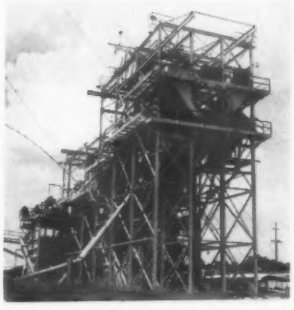
ZZL-0812 Curing agent for ERL-2774, ERL-2795. Pot life at room temperature. 30-35 min. for ERL-2774; 40-45 min. for ERL-2795.

ZZL-0814 Curing agent for ERL-2774, ERL-2795. Pot life at room temperature. 10-15 min. for ERL-2774; 10-15 min. for ERL-2795.

PHENOLIC BAKELITE PHENOLIC RESINS

offer durability, chemical resistance, flexibility, and moisture resistance. They may be modified with a wide variety of drying oils and resins.

A maintenance coating, based on BAKELITE phenolic resin, protects this washing plant at the Virginia-Carolina Chemical Corporation against corrosion resulting from the great amounts of water that are used to wash the phosphate from the ore in the production of fertilizers.



100% PHENOLIC NON-HEAT-HARDENING

CKR-2103 Recommended for economical, durable, water-resistant primers, colored topcoats and ready-mixed aluminum paints. Fast cooking and good drying speed.

CKM-5254 Outstanding in cooking and drying speed, durability, water resistance, and chemical resistance.

CKR-0036 Produces durable, gasproof, chemical-resistant tung and oiticica varnishes. Has superior stability with basic pigments.

CKM-2400 Produces varnishes with good color retention, excellent durability, good water resistance, and solvent tolerance. Fast cooking and drying speed. Highly durable, gasproof varnishes can be produced from this resin by the cold-blending technique.

CKM-2432 Good durability, resistance to water and chemicals, and aliphatic hydrocarbon tolerance. Relatively slow cooking and drying times.

100% PHENOLIC—HEAT-HARDENING

CKR-1282 Principal use is in combination with blown drying oils for through-curing tough, chemical- and water-resistant coil impregnating varnishes.

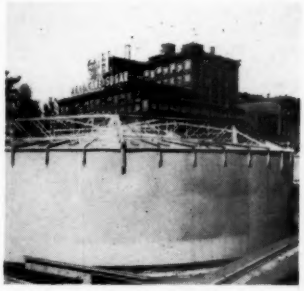
CKR-1634 Widely used in adhesive compositions, and in upgrading rosin or ester gum.

DISPERSIONS

CKU-5962 Quickest drying, hardest, and most solvent and water-resistant dispersion. Used to speed film hardening of alkyds and varnishes and to produce lacquer-resistant undercoats.

ZKU-0624 Better color retention, aliphatic solvent tolerance and compatibility with a greater variety of alkyds and varnishes than CKU-5962. Used extensively in traffic paints.

Since 1953, the interior of this one-million gallon liquid sugar storage tank in the California & Hawaiian Sugar Company Plant has been protected by a baked coating based on BAKELITE phenolic resins. Coatings of this type have been successfully used in food processing for many years.



PHENOLIC BAKING RESIN AND SOLUTIONS

BKS-2600 Offers best solvent resistance and chemical resistance (with the exception of alkalies) of the baking resins. Produces lighter colored baked films than most resin solutions of this class and requires lower baking schedules to convert to the insoluble, infusible stage.

BKS-2710 Exhibits best compatibility with chemical and resinous plasticizers, but not normally used in baking applications. Most important use is with BAKELITE vinyl butyral resin XYHL in Western Pine Association Knot Sealer WP-578.

BKS-2673 Similar to BKS-2600 in properties and applications; however, offers somewhat better flexibility and compatibility with film-forming plasticizers.

BKR-2620 This resin is more economical and flexible than BKS-2600. It is more compatible with other resins and plasticizers and allows a broader choice of solvents.

UNION CARBIDE

For more information circle No. 1—last page

A100

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MARCH
1961

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOLUME 51
NO. 4

1961 BUYERS' GUIDE

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New Eastman high-flow retarder solvent offers lacquer formulators 4 important advantages

Higher Solids Content
Better Flowout and Leveling
Lower NC Solution Viscosities with Toluene
Blush Control with Good Solvent Release

Methyl isoamyl ketone (MIAK) is a new high-boiling solvent with remarkably high solvency for nitrocellulose, cellulose acetate butyrate, acrylics and vinyl copolymers. Its unusual solvent power permits you to formulate high solids lacquers that exhibit superior flowout and leveling. Its solvency is greater even than that of n-butyl acetate. (See table at right)

MIAK has a high toluene dilution ratio (4.1). Of even greater significance, however, is the low viscosity of MIAK/toluene-nitrocellulose solutions. As the graph at right indicates, the viscosity of such solutions is lower than that of 2-ethoxyethyl acetate/toluene or even methyl isobutyl ketone/toluene solutions.

With an evaporation rate of 0.55, MIAK is slow enough to provide excellent blush control, yet not so slow as to delay sanding and rubbing operations.

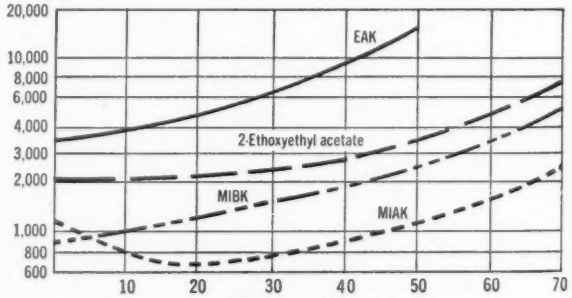
Another point. MIAK has a mild ester-like odor, much more pleasant than the characteristic odor of the higher ketone solvents.

Investigate this new high-flow, retarder solvent in your formulations. Its cost per gallon is competitive with most other retarder-type solvents. Write for a sample of methyl isoamyl ketone and Technical Data Sheet M-105.

Comparison of Solvent Power of MIAK with Other Solvents
Viscosity, cps. @ 25° C.

Solvent	Evaporation Rate	10% ½ Sec.R.S. Nitrocellulose	10% Half-Second Butyrate	20% Acryloid B-82 Resin	20% VYHH Copolymer
MIBK	1.6	30	23	15	138
n-Butyl Acetate	1.0	44	36	26	GEL
MIAK	0.55	44	33	21	168
Ethyl Amyl Ketone	0.3	86	Ins.	28	286
2-Ethoxyethyl Acetate	0.2	122	68	50	Ins.

Effect of Toluene on the Viscosity of 20% R. S. 1/2 Sec. Nitrocellulose Solutions



MIAK

Eastman high-flow retarder solvent

Eastman CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, N. C.; Houston; Kansas City, Mo.; New York; Philadelphia; St. Louis.

Western Sales Representative: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

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Use the chart below to select the grades of ASBESTINE which are most applicable to your current products or those under research. It might be too that a combination shipment of these inert functional pigments will fulfill your every extender need. Review these typical data.

ASBESTINE GRADE	% <325 Mesh	Hegman* Fineness	Ku Range Paint Test Formula	Oil Absorption G-C	Water Absorption cc's per 100 grams	Particle Shape	Remarks
X	98.5	<1	70-76	29-32	75-95	semi-fibrous	low oil demand; high PVC possible; low Ku range; for exterior paints.
3X	98.5	<1	76-81	37-41	120-140	fibrous	general purpose pigment for oil, oleo-resinous, water emulsion interior and exterior paints.
FINE TEXTURE	99.5	1½-2	76-83	37-42	110-130	fibrous	slightly higher consistency than 3X; improved Hegman; for interior and exterior paints.
5X	97.5	<1	87-100	47-53	145-165	fibrous	high oil absorption; most fibrous Asbestine; higher consistency range; for exterior oil and water paints.
325	99.98	4-4½	75-81	37-41	90-120	semi-fibruos	"tailored"** talc; medium oil absorption and consistency; for oil and water paints.
425	99.99	5-5½	77-85	45-52	110-140	semi-fibrous	"tailored"** talc; medium/high oil demand; for industrial paints.
625	99.99	5½-6	125-140	65-72	190-240	platey	"tailored"** platey talc; highest oil absorption and consistency; imparts flatting; reduces gloss; for low sheen paints.

*Hegman obtained by hand mixing in linseed oil.
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For more information circle No. 5—last page

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☐ *Driers for Drying Oils*
☐ *Surface-Active Agents and Emulsion Paints*

WITCO CHEMICAL COMPANY, INC.
ORGANIC CHEMICALS DIVISION
122 East 42nd Street, New York 17, N. Y.

For more information circle No. 6—last page

HOW TO USE THE 1961 BUYERS' GUIDE

THE 1961 REVIEW AND BUYERS' GUIDE is the ninth in a series of annual summaries covering technological and trade developments in the paint and coatings industries. The series is intended as a guide to the literature and as a source of information on various phases of paint technology, manufacture, and application.

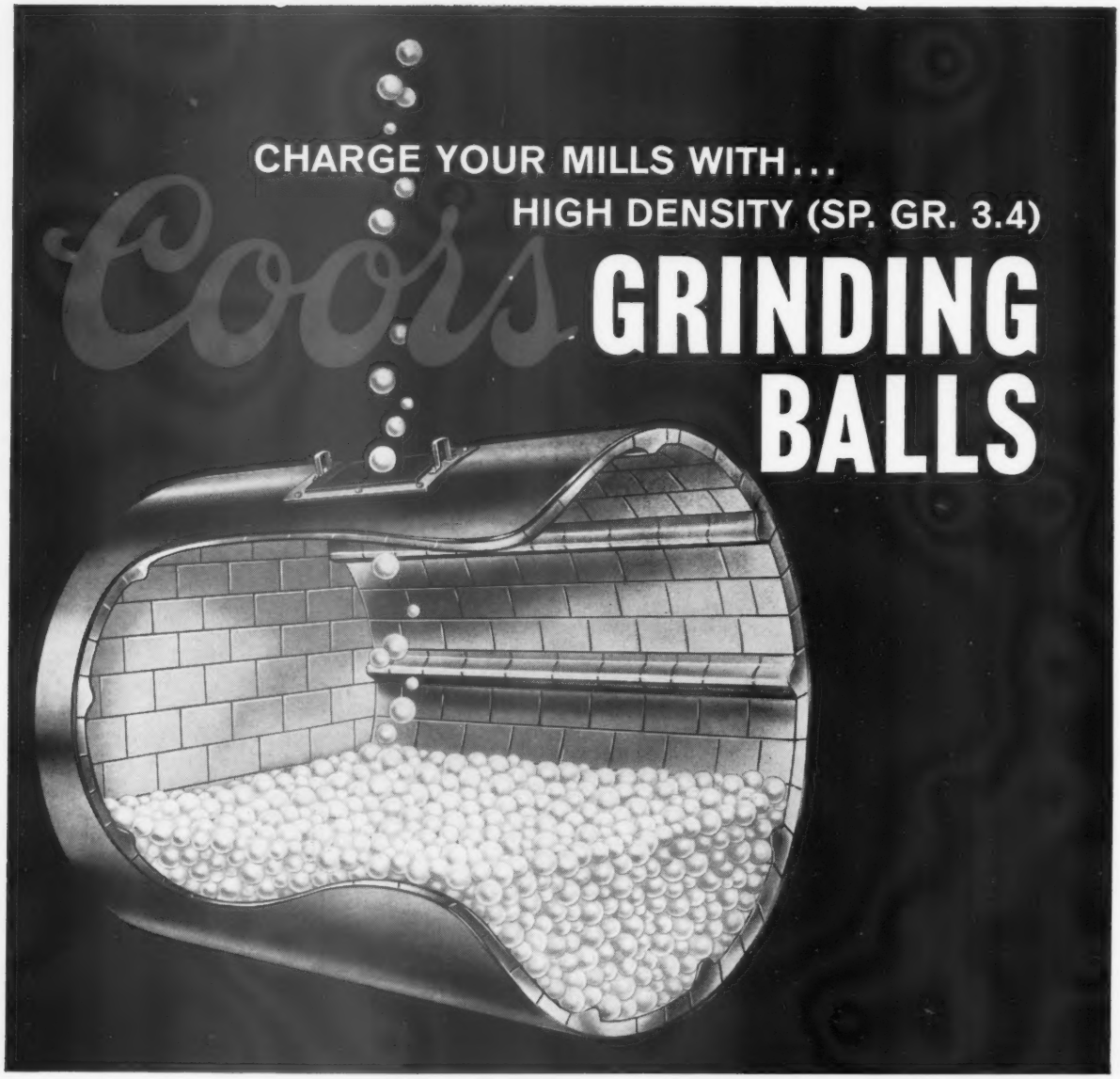
The following format is divided into three sections: The Buyers' Guide, World Wide Review of 1960 and The Directory Section.

The Buyers' Guide section describes in detail all equipment and raw materials of interest to those engaged in paint production, formulation, development and testing. With some 125 items covered, the reader has at his disposal a complete and handy reference of products offered to the paint industry during 1960.

The World Wide Review section covers technical developments during 1960 in the areas of Synthetic Resins, Emulsions, Drying Oils and Derivatives, Solvents, Intermediates, Pigments, Driers and Additives, Production, various types of Coatings, Corrosion, Aerosols, Performance Testing and Chemical Analysis. It will be noted that treatment in certain of these fields differs from that of last year's Review. This follows from a shift of interest in the industries themselves; for example, developments in latex exterior emulsion paints are reflected in an increased number of references dealing with that aspect of the subject. It should be pointed out, however, that general emphasis in the World Wide Review is upon literature directly pertinent to the paint and coatings industries, and more particularly upon material that might help the manufacturer and formulator. There has been an attempt to expand coverage of foreign literature, and it is hoped that future issues of the Review will carry this further. The pioneer work of PAINT AND VARNISH PRODUCTION in citing data published behind the Iron Curtain may be noted here.

Bibliographies are listed, under individual subjects, at the end of the Review text, beginning on page 146, so that those interested in reviewing the literature, whether for a whole or for a limited area, will have at hand a compilation of about 600 references.

The Directory Section comprises seven different listings. These include: Suppliers of Raw Materials and Equipment, Canadian and Mexican Addresses of United States Firms, Materials and Equipment Directory, Aerosol Suppliers' Directory, Sales Agents and Distributors, Trade Associations and Societies, and the Trade Name Directory.



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We shall be glad to give you our recommendations on how to achieve these results if you will write to us on your company letterhead and describe your operating problem.

COORS PORCELAIN COMPANY

600 NINTH STREET—GOLDEN, COLORADO

Manufacturers of High Density Grinding Media and Mill Liner Brick.

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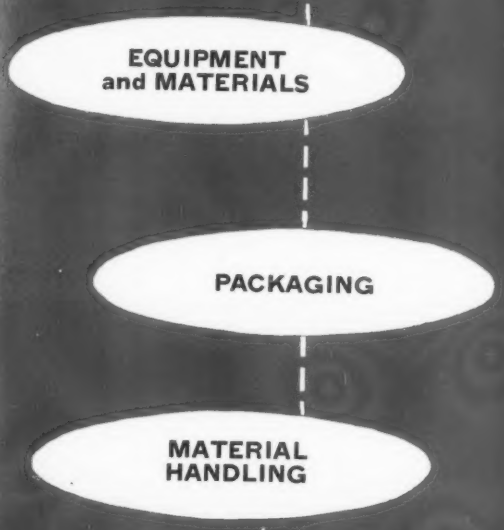
section 1

BUYERS' GUIDE



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NEW EQUIPMENT AND MATERIALS

This section contains a compilation of new materials and equipment introduced in 1960. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

ALIPHATIC CHEMICALS
Tertiary Amines

A new group of aliphatic chemicals called "Propomeens" has been developed by the Armour Industrial Chemical Co.

The chemicals are suggested for research and development in applications requiring oil soluble amines and cationic surface activity. It is also expected that the amines will be useful as dispersants in hydrocarbon systems, defoamers in acid systems and as oil additives.

Armour Industrial Chemical Co., Dept. PVP, 110 North Wacker Dr., Chicago 6, Ill.

ANTI-MILDEW POWDER
Non-toxic

New anti-mildew powder is being marketed after three years research to formulate an effective, non-toxic product for preventing mold, mildew and fungus on painted surfaces.

The new anti-mildew compound contains no mercury or other poisonous compounds and can be added to any oil, water and synthetic based paint, flat gloss and enamel finish, varnish and shellac, and used for interior or exterior application. It does not change the color or normal characteristics of the paint and is odorless in paint. Its effectiveness is guaranteed when used and applied according to directions.

The product will be offered to paint manufacturers in 50 pound bags to be mixed with their various products and marketed under their own brand names. Full approval has been provided by the United States Department of Agriculture. Dianol's technical department can handle the registration procedure with the USDA for any manufacturer's product, as well as the label approval, at no cost. Individual state registrations can also be taken care of, where required, at no cost other than the small annual registration fee charged by most states.

The new anti-mildew compound adds to a rapidly expanding line which already includes approved paint insecticide and an anti-fouling compound for marine use.

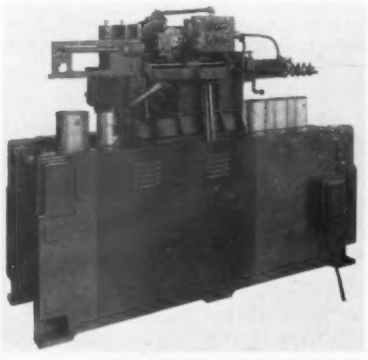
Dianol Div., Mills-Pearson Corp., Dept. PVP, St. Petersburg, Fla.

ASSEMBLING MACHINE
Shapes Bails

New automatic bail making and assembling machine, shapes bails (handles for cans) and affixes them mechanically to one-gallon double-tite paint cans at the rate of up to 40 a minute, thus eliminating the tedious task of putting them on by hand.

The machine answers a need that has existed for more than forty years in the paint industry. It removes the last hand-operated step in the production-line assembly of one-gallon double-tite paint cans and enables a plant to realize impressive savings in time and in costs.

The new machine removes the storage problem completely. Bails are fabricated right on the machine the second before they are locked into the ears of the can. A single reel of wire coil, which can produce up to 8,500 bails, now replaces the individual pre-formed bails. The machine, which is capable of shaping and assembling up to 2,400 bails an hour (19,200 in an eight-hour work day) frees four men—bail maker, carter, sorter and inserter—for other production line assignments.



AMERICAN CAN

The new machine enables the production line of the one-gallon double-tite paint cans to function for the first time as a fully automated unit. The unit itself is compact. It takes on approximately 14 square feet—about the same area as an executive desk—and can be easily integrated into present production line setups.

The machine's dimensions are 24 inches wide, 79 inches long and 61 inches high. It takes unformed coil wire, shapes and forms it into bails and assembles each bail to the ears of the one-gallon cans in a smooth, continuous, uninterrupted and fully automated operation.

American Can Co., Dept. PVP, 100 Park Ave., New York 17, N. Y.

AUTOMATIC FILLER
No Drains or Traps Needed

New Model 27 Autofiller reportedly can cut titration time up to 30%. It increases accuracy and reduces titration cost by eliminating the need for manual replenishment and adjustment of burette contents to volumetric zero for each titration. After each titration, the operator pushes a button on the control box; the Autofiller allows titrant to flow into the burette and stops it automatically when the titrant reaches a sensing probe placed at the zero level. The burette is now filled exactly to the mark and is ready for the next titration. The Autofiller thus provides "push-button" automatic burette refill to an exact zero level without attention or adjustment.

The Model 27 Autofiller needs no

PAILS-DRUMS

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- ALL STYLES — Closed head or Open Head. Plain Pouring Nozzles or Specified Spouts. Bolted or Lever Closures.
- BAKED-ON PROTECTIVE FINISHES. Pails and Small Drums beautifully Lithographed. Large Drums custom painted and printed.
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Executive Offices: 3075 No. 35th Ave. (P.O. Box 1510) Birmingham, Ala., Telephone VI 1-8668

BELLWOOD, ILLINOIS ● Vulcan Containers Inc. ● **BIRMINGHAM, ALABAMA** ● Vulcan Steel Container Co. ● **DALLAS, TEXAS** ● Southwestern Steel Container Co. ● **SAN LEANDRO, CALIF.** ● Vulcan Containers Pacific Inc. ● **PEABODY, MASS.** ● Atlantic-Vulcan Steel Containers, Inc. ● **REXDALE (Toronto) ONTARIO, CANADA** ● Vulcan Containers (Canada) Ltd. ● **NEW WESTMINSTER (Vancouver) BRITISH COLUMBIA** ● Vulcan Containers (Canada) Ltd.

For more information circle No. 8—last page

NEW EQUIPMENT AND MATERIALS

This section contains a compilation of new materials and equipment introduced in 1960. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

ALIPHATIC CHEMICALS
Tertiary Amines

A new group of aliphatic chemicals called "Propomeens" has been developed by the Armour Industrial Chemical Co.

The chemicals are suggested for research and development in applications requiring oil soluble amines and cationic surface activity. It is also expected that the amines will be useful as dispersants in hydrocarbon systems, defoamers in acid systems and as oil additives.

Armour Industrial Chemical Co., Dept. PVP, 110 North Wacker Dr., Chicago 6, Ill.

ANTI-MILDEW POWDER
Non-toxic

New anti-mildew powder is being marketed after three years research to formulate an effective, non-toxic product for preventing mold, mildew and fungus on painted surfaces.

The new anti-mildew compound contains no mercury or other poisonous compounds and can be added to any oil, water and synthetic based paint, flat gloss and enamel finish, varnish and shellac, and used for interior or exterior application. It does not change the color or normal characteristics of the paint and is odorless in paint. Its effectiveness is guaranteed when used and applied according to directions.

The product will be offered to paint manufacturers in 50 pound bags to be mixed with their various products and marketed under their own brand names. Full approval has been provided by the United States Department of Agriculture. Dianol's technical department can handle the registration procedure with the USDA for any manufacturer's product, as well as the label approval, at no cost. Individual state registrations can also be taken care of, where required, at no cost other than the small annual registration fee charged by most states.

The new anti-mildew compound adds to a rapidly expanding line which already includes approved paint insecticide and an anti-fouling compound for marine use.

Dianol Div., Mills-Pearson Corp., Dept. PVP, St. Petersburg, Fla.

ASSEMBLING MACHINE
Shapes Bails

New automatic bail making and assembling machine, shapes bails (handles for cans) and affixes them mechanically to one-gallon double-tite paint cans at the rate of up to 40 a minute, thus eliminating the tedious task of putting them on by hand.

The machine answers a need that has existed for more than forty years in the paint industry. It removes the last hand-operated step in the production-line assembly of one-gallon double-tite paint cans and enables a plant to realize impressive savings in time and in costs.

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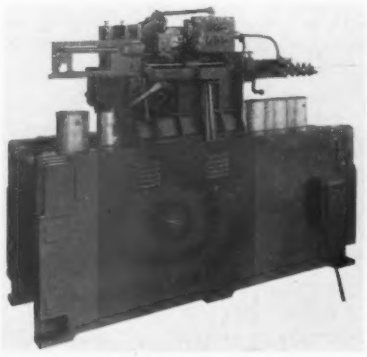

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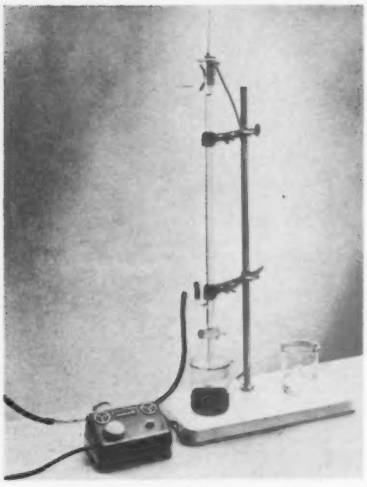


COLEMAN INSTRUMENTS

drains or overflow traps. It can be used with any standard 5, 10, 25 or 50 ml, open top, side-fill burette and with any titrant sufficiently ionized to be electrically conductive.

Coleman Instruments, Inc., Dept. PVP, 42 Madison St., Maywood, Ill.

BALL MILLS

All-Steel Construction

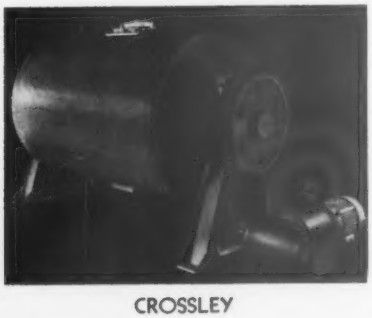
New line of ball mills at the same price levels as its original line, which has been on the market for over 50 years has been announced.

The new ball mills feature all-steel construction and roller bearing pillow blocks for all sizes. Named the "Double-C" line, the mills can carry double the charge weight for which they are rated. The 6′ x 8′ model is rated for 4500-lb. charge, and will carry 9,000 lbs. of high density media. 15 psi air pressure can be applied for fast unloading.

With the trunnions rotating in roller bearing pillow blocks, the mills will always be in perfect alignment. This roller bearing construction also permits greater starting ease, will decrease power requirements and wear.

The new line has 24 models ranging in sizes from 18″ x 24″ to 80″ x 77″.

The Crossley Machine Co., Dept. PVP, Trenton 9, N. J.



CROSSLEY

BARREL TRUCK

Facilitates Pallet Loading

A drum and barrel truck, which is said to make it possible for one operator to easily place heavy drums on pallets, has just been announced.

Designated Ezy-Rol Barrel Cart, the manufacturer states that the design of this truck allows the barrel to be carried at pallet height so that in one forward motion the drum can be placed on a pallet with a minimum of operator effort. It is also said that drums can be safely lowered from pallets with this cart.

Although an extra set of wheels is primarily used on this truck to facilitate pallet loading, the four wheels do carry the entire load thereby greatly reducing operator effort when moving heavy drums.

VALLEY CRAFT

The hazard of moving heavy drums down ramps or steep inclines can also be eliminated with this truck, it is claimed, as it is available with two-wheel safety brakes which give the operator complete control of the load.

The main frame of this barrel truck is said to be constructed from heavy steel tubing with a 1″ diameter replaceable axle. It is also available in aluminum where light weight is a factor such as in delivery service.

Wheels are equipped with ball bearings to provide an "easy roll" regardless of temperature or weather conditions. Solid rubber tires or pneumatic wheels are optional.

Valley Craft Products, Inc., Dept. PVP, 770 Jefferson Ave., Lake City, Minn.

CAN CLIPS

Assures Safe Transportation

Safety through the mails or by any other conventional means of transportation including air freight is assured by new triple-grip can clips.

No training or experience is needed to apply these simple little U-shaped metal clips around the lid of a friction top can. For example, to seal the lid of a typical gallon-size paint can, five triple-grip can clips are equally spaced around the circumference of the can. The clips are then pushed into the upper part of the lid groove with only light pressure with the thumb. And then they are securely forced into the groove with an upward movement of a can clip applicator.

The applicator wedges part of the clip down into the groove while the ends of the clip clamp securely.

Once a friction top can lid is sealed with the triple-grip can clips, it stays sealed and will safely travel across the city by truck, from one end of the country to the other by rail, or around the world by all means of transporting goods.

Freund Can Co., Dept. PVP, 4445 S. Cottage Grove Ave., Chicago 53, Ill.

CAN LID CLIP

Easy to Install

Newly developed can lid clip provides an approved, low-cost, and time-saving alternative to the postal regulation requiring the soldering of lids to cans sent through the mail.

The lid clips will greatly facilitate can-handling procedures for businesses and manufacturers that mail cans of oil, paint, compound, solvents, plastics, drugs, foods, lubricants, samples, fuels, farm-garden fertilizers, chemicals, etc.

Can lid clips are installed with a press of the thumb or hammer hit and are easily removed with a twist from a screwdriver. The clips fit all standard type cans on the market up to one-gallon capacity and enable the recipient to

ANCHOR

open and reseal the can without damage.

Three sizes of clips are now in production. The G-12 for use on gallon cans, the Q-6 for pint and quart cans, and the P-3 for pint and lesser can sizes.

According to postal rulings, eight clips must be used on gallon cans, six on quart cans, and four on pint cans.

Anchor Chemical Co., Box 2775, Dept. PVP, 10721 Briggs Rd., Cleveland 11, Ohio.

CARTON CLAMP
Equal Clamping Pressures

New carton clamp attachment with a load side shift for use with electric trucks has been announced.

The carton grab arm design insures equal distribution of clamping pressures over the entire contact area, so that even the most fragile containers are readily handled without damage. These arms are ideal for handling electrical goods, paper products, appliances, packaged foods and other light and bulky materials. High friction contact surfaces on the plates prevent scuffing and reduce the clamping pressure to a minimum.

LEWIS-SHEPARD

This truck-attachment combination offers the user a versatile piece of equipment providing rapid transport, neatly aligned loads and warehouse patterns, increased utilization of warehouse height, palletless operation and convenient skimming.

Lewis-Shepard Products, Inc., Dept. PVP-R10-8, 125 Walnut St., Watertown, Mass.

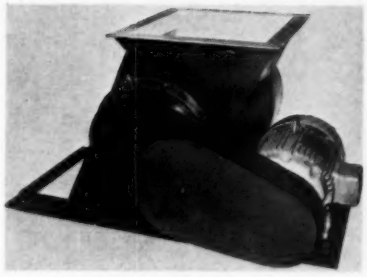
CENTRIFUGAL PUMPS
Extremely Compact

Reduced space requirements for the new line of OJV and OMV vertical split case pumps makes them ideal for applications where extreme compactness is of prime importance. Characteristics and features that have established the long-life dependability and performance of the OJV and OMB horizontal split case pumps have been retained. The case is split parallel with the impeller shaft with the suction and discharge flanges integral in the vertical base section. Rotating unit is removed easily for inspection or maintenance without disturbing the suction or discharge piping connections. Perfect bearing alignment is achieved with in-line boring with top half of case in position. Double suction impellers are hydraulically and dynamically balanced for smooth, quiet operations. Ideal for handling high capacities at medium to high heads and continuous operations these pumps are used on applications such as marine services, municipal water service, industrial water service, booster service, cooling towers, fuel service, circulating and boiler feed. Capacities range to 6000 GPM and heads to 380 feet.

Aurora Pump Div., The New York Air Brake Co., Dept. PVP, Aurora, Ill.

CHOPPING DE-LUMPER
Low RPM

New stainless steel, heavy duty chopping de-lumper No. 1075B, chops and de-lumps with minimum fines, low rpm, low temperature rises: rosin, resins, anhydrides, waxes, shellac, varnish, and other heat sensitive or semi-tacky materials.



MILLER

The chopping and de-lumping mechanism consists of a slowly revolving toothed single roll on which a large number of replaceable, non-swinging teeth are fastened. Many types and sizes of teeth are available including pick, hatchet, hammer, and anti-clog types. Teeth pass through a stationary sizing comb furnished in many styles to suit the material.

Reduction and de-lumping takes place as one after the other of the pick-like teeth come in contact with the material. This occurs rapidly in succession in a staggered manner to rock the chunks and prevent jamming. Tooth angle is such that chunks of any size up to full hopper dimension are chopped. Feed is automatic as teeth grab chunks of all sizes and force them against the size limiting comb for final reduction.

Final reduction and sizing takes place as teeth trap over-sized pieces against the rugged comb. Desired size particles are pulled through the comb and discharged downward by centrifugal force. The single toothed roll does the entire action, resulting in a chopping de-lumper which is simple, positive acting and durable.

Machine takes up to 16″ feed in 16″ x 16″ opening. Product choice: ¼″ to 4″. Weight of machine 1200 lbs., 5 to 10 h.p. motor. Larger units are available in steel, carbon steel and cast iron.

Franklin P. Miller & Son, Inc. Dept. PVP, 36 Meadow St., East Orange 13, N. J.

CLOSING MACHINE
For Inserting Caps

Following up last year's introduction of its Flip Cap, a polyethylene nozzle with a permanently attached cap for use on round

CONTINENTAL CAN

and oblong nozzle-type cans, Continental Can Co. announces the availability of a hand operated closing machine to insert the cap on the can and close it.

Metal cans using the Flip Cap are delivered to packers with a large perforated top opening, rather than the smaller threaded metal nozzle opening, to permit faster product filling. The Flip Cap must be inserted into the specially curled perforation by the packer, after filling.

While equipment is available for automatic, high speed insertion of caps, the firm believes the new Flip Cap Closer will find a market among smaller packers who can use an inexpensive machine that can be operated at speeds of 20 cans a minute or more, depending upon manual operator's facility. The all-steel machine weighs 14 pounds, is set on a 10″ x 10″ base to be bolted to a work bench, and has a height of 16″.

In its operation, a Flip Cap is hand-placed on the top opening of a can, then a round plate presses the cap firmly into the curled opening. Although nozzles are delivered with the captive cap seated in the closed position, the machine will also close any partially-opened caps as it does the inserting job.

Continental Can Co., Dept. PVP, 100 East 42nd St., New York 17, New York.

CODER

3-Color Operation

High-speed coding and printing without the mess and fuss of fluid inks are now possible through the development of a new series of machines.

The Model 100 series of coders and printers is designed for attachment to packaging machines or powered conveyors of all types. They synchronize with the action of the parent machines, printing onto boxes, cartons, craft paper, and other porous or semi-porous surfaces.

Inking of the coders is done by a roll of Porelon solid ink. This roller, a self-contained inker, replaces fluid inks, solvents, fountains, felts and the maintenance connected with such items; it cannot drip, evaporate or gum up; when exhausted, it can be changed in less than 10 seconds.

THOMAS

The new 100 series coders are compact and well constructed, with anti-friction bearings guaranteeing rugged, trouble-free performance. The machine itself measures 7 x 4-3/8 x 3″, with an extended drive shaft 8″ long. Printing head diameters of 6″, 8″, and 10″ are available to accommodate various pitch distances in the feeding of packages through conveyor systems.

The coders print from any position, onto any side of the package. They will print up to 250,000 quick-drying impressions onto any porous or semi-porous surface, with a single roll.

Thomas Engineering Co., Dept. PVP, 9257 N. Laramie Ave., Skokie, Ill.

CODER-PRINTER

Anti-Friction Bearings

New and unique production coder and printer may provide the answer to the mess, fuss and expense of maintenance connected with fluid-ink, gravity-feed machines.

The Porelon plastic roller in the coder eliminates the need for fluid inks, solvents, ink fountains and reservoirs, transfer rollers and their maintenance. Each cylinder holds enough ink in suspension for up to 150,000 marking impressions. The Porelon plastic roller cannot drip or gum up—can be cleaned with one swipe of a damp cloth. When exhausted, it can be replaced in less than 15 seconds.

The fully automatic, friction operated coder is designed and engineered for continuous, rugged, trouble-free performance. It can be used to print from virtually any position including overhead, on any level surface of filled bags, packages, cartons, or shipping containers.

Anti-friction bearings guarantee continuous, trouble-free performance. Simple locking devices hold both the printing cylinder and the Porelon plastic cylinder in place, require a minimum of down time in changeover. An aluminum cover provides maximum protection from dust for all moving parts. A spare head is included with each coder.

The printing head of the Model 601 is 1″ in height, 15″ in circumference. Model 603 has a 3″ face printing surface with which up to three colors can be printed simultaneously.

Porelon plastic cylinders for the coder are available in violet, red, black, and green. Additional colors are presently under development.

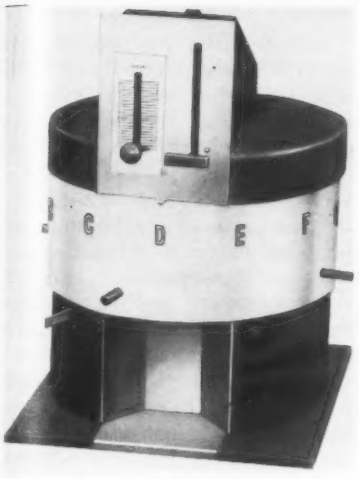
Thomas Engineering Co., Dept. PVP, 9257 N. Laramie Ave., Skokie, Ill.

COLLOIDAL DISPERSIONS

Aqueous, Solvent Compatibility

New series of dispersions of carbon blacks is available in either butyl alcohol or isopropyl alcohol. These colloidal dispersions are being marketed under the "Alcoblaks" trade name. Four different carbons in each of the alcohols are currently available.

Columbian Carbon Co., Dept. PVP, 380 Madison Ave., New York 17, N. Y.



SEPE

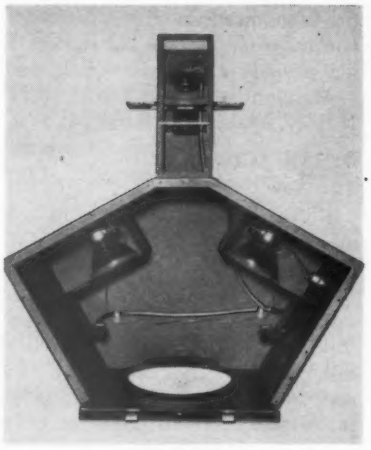
COLORANT DISPENSER
Twelve Canisters

New, low cost, completely manual, bench model colorant dispenser has been introduced. New machine now makes it possible for any size paint or hardware store to have modern, up-to-date colorant facilities. The compact bench model "Matchmaker"—it takes only 24 x 24 inches of space—has the same accuracy, superb engineering and dependability as the larger unit. Its 12 canisters with 1½ quart capacity provide unlimited color combinations for all types of paint. It weighs approximately 115 pounds.

The unit is easy to use. Simply select required increment, raise plunger and depress plunger. Sturdy steel construction with a minimum of moving parts assures long life with little or no maintenance. The unit is guaranteed for one year. The Model 400 is available in any increments for any color systems. Sales aids available include a master color counter book with over 1,000 colors.

Since color is a big factor in paint sales, the units with an almost unlimited selection of colors, provide an opportunity for increased sales volume. Yet they require only a fraction of the inventory and investment needed for tube systems. And there is never a problem of obsolescent colors with the colorant dispenser.

Sepe Bros., Dept. PVP, 408 S. Varney St., Burbank, Cal.



GARDNER

COLOR CONTROL METER
Reflectance Valves

Special photometric instrument, designed originally for a leading manufacturer of china dinnerware to help control the color of the pattern applied to each dish before firing, consists of a unique type of exposure head that is coupled with a photometric unit for taking actual readings on a large dial of the reflectance values obtained through various filters.

The sample, ranging in diameter from 5″ to 11″, is placed inside the dark chamber and strongly illuminated from above and from both sides. The reflected light coming from the variable color pattern and the uniform background passes upwards through a collecting lens, a selected filter (green, amber or blue), and an aperture with an adjustable stop. The image of the pattern finally falls on the surface of a photocell at the top. The photometric signal that is produced is then amplified and measured against signals coming from comparison photocells in the usual fashion.

In actual operation some arbitrary value, such as 50.0, is assigned to each filter and aperture stop selected for establishing the target value of an acceptable standard. Numerical tolerances above and below this value can then be established for rejecting light or dark pattern colors.

Although the meter was designed for a particular problem in the ceramics industry, it can be modified as needed to control the color of any pattern, regular or irregular, that is applied to a background of uniform color and only slight curvature. For example, the colors of small fruits, vegetables, flowers or leaves in their natural state may be measured by laying them on a white or gray surface.

Gardner Laboratory Inc., Dept. PVP, P. O. Box 5728, Bethesda 14, Md.

CONVEYOR BELT
Corrosion-Resistant

Lower horsepower requirements, simplified assembly and installation, a body depth one-half that of previous models, and a new belt design that permits conveyor lengths up to 500 feet, are features of a newly redesigned unitized all-metal belt conveyor.

In addition, the new conveyor features a continuous speedbar channel on both sides of the conveyor. This channel permits the fastening of side tables, deflectors, electric controls, and other attachments at any point along the sides of the conveyor without the need for drilling. This channel can also be used to connect legs or ceiling supports at any position to suit building conditions or to clear obstructions. Items are fastened to the channel by means of ¼″, 5/16″, ¾″ or ½″ bolts.

The metal belt of the conveyor is made of smooth, zinc-coated steel, which has excellent resistance to oil solvents, and corrosion. The belt is designed so that the gap between slats does not exceed .015″ even when turning around the sprocket. Belt widths from 12″ to 36″ are available. It is self-tracking with an improved track design which permits push-on or push-off of heavy loads from the sides without disturbing the belt.

As with previous models, the conveyor is made in standard 10 foot sections and any number of sections may be easily connected to form a one piece conveyor up to 500 feet in length. Standard vertical curves of 5°, 10°, 15°, and 20° may be used for multi-level conveying. Conveyor sections may be added or removed, as needed, to meet new plant layouts and changing conditions.

The conveyors feature a positive sprocket drive which assures exact speed synchronization and auto-

matic holdback on inclined and vertical conveying. Hardened steel ball-bearing rollers running on a smooth steel track keep horsepower requirements low while providing speeds up to 60 feet a minute. The belt of the conveyor does not stretch and is not affected by humidity. An automatic take-up compensates for heat expansion when the conveyor is used for heat expansion when it is used for oven conveying.

Because of its heavy duty bed design, legs or ceiling supports may be placed on 10 foot centers. By means of the speedbar channels, however, they can be placed at any position without drilling. Legs have a 6″ adjustability to compensate for unlevel floor areas.

As a safety factor to prevent worker injury and to minimize maintenance, the sides of Armorbelt conveyors are totally enclosed. The body depth of the newly designed conveyor is only 4¼″ compared to 10½″ for previous models.

M-H Standard Corp., Dept. PVP, 515 Communipaw Ave., Jersey City 4, M. J.

DEW DETECTOR
High Impedance

The model 5217 dew detector is a new instrument, with high impedance, millivolt relay, coupled with a sensor of special design, in such a way that it will detect presence of moisture with a very high order of sensitivity—more so than former dew-point measuring apparatus and record the total "time-of-wetness."

It has a threshold adjustable from 0.05 to 0.4 volts and a differential of 0.03 volts. Input impedance is 10 megohms.

Its largest application to date has been in corrosion analysis studies. It is expected to have other applications in corona studies or anywhere that a precise indicator of the presence of moisture is required, or where automatic control of apparatus during wet or dry periods is needed.

MELTRONICS

Meltronics, Inc., Dept. PVP, 1010 N. Main St., Elkhart, Ind.

DIMER ACID
Two New Grades

Full commercial status of two new grades of dimer acid is announced.

Empol 1024, is similar to the current standard commercial grade of dimer acid, Empol 1022. However, it contains less than 1% monobasic acid (1022 has 2-5%), making it more suitable for polymer uses.

Empol 1014, is a 95% dimer acid also containing less than 1% monobasic acid. Full commercial availability of the new grades of dimer permits users to select optimum composition for specific uses.

Present markets for dimer acid include rust inhibitors, surface coatings, urethane foams, polyamide and polyester resins, lubricating compounds, waterproofing agents, and surface active agents, among others.

Empol 1024 was developed to meet the need of a dimer acid with an extremely low monobasic acid content for urethane foams. Its 1% maximum monobasic acid content makes it suitable for all such polymeric end-products, in which as much as 5% monobasic acids may interfere with desired properties.

Empol 1014 is the first pure dimer acid offered commercially. It extends the use of dimer acid to all applications which could not tolerate the high proportion of trimer acid present in Empol 1022 and 1024. Long dimer polymer chains can now beformed with little cross-linking. For example, in alkyd resins, where dimer acid is incorporated as a replacement for the fatty modifier and a portion of the dibasic acid to improve through-dry, toughness, and flexibility, appreciably more Empol 1014 can be used than Empol 1022 before gellation occurs.

Emery Industries, Inc., Dept. PVP, Carew Tower, Cincinnati 2, Ohio.

DISPERSE DYES
Fine Powders

Three new disperse dyes, are currently being made available.

Genacron Blue 3R and Genacron Violet BN offer related violet-blue shades in the company's special *Genacron* range of disperse dyes, recommended primarily for dyeing polyester fibers. The feature of the two products lies in their high color value, excellent buildup, and fastness to light, washing, perspiration, and hot pressing. The dyes are particularly well suited for deep blue and navy shades on dress goods and suitings.

Genacron Blue 3R yields bright reddish blue shades on polyester fibers, for self-shade dyeing or as an economical base or shading color for fast blue and navy tones in all practical shade depths.

Genacron Violet BN dyes a bluish violet hue, has properties similar to those of its companion product, and serves equally well as a base or shading dye.

The third new color, *Genacron Blue GGL* dyes an attractive, greenish blue shade on polyester fibers. The dye is highly suited for this purpose, exhibiting strong tinctorial value and buildup, very good stability to sublimation, and excellent fastness to light, washing, and perspiration. High heat stability permits dyeing by pressure or pad-heat curing methods as well as by carrier application. The clean, bright shade is especially useful for dyeing medium to heavy shades of blue, green, or navy for wearing-apparel fabrics.

The new dyes are supplied as uniformly fine, easily dispersible powders. Application of the dyes can be made by all conventional methods to stock, yarns, or piece goods of straight polyester-fiber goods or blends containing wool, cotton, or viscose rayon.

General Aniline & Film Corp., Dept. PVP, 435 Hudson St., New York 14, N. Y.

DISPERSER
Push Button Control

New, completely automatic, variable speed, push button control disperser is now available. Machine features a unique impeller, patent pending, which is designed with a jutting angle outward from the center. Each blade has two holes which throw material into the vortex, reducing it and elimi-

nat ng air pockets at very high or low speeds. Thus, paint, ink, or any other materials dispersed are rea y for immediate canning without the ordinary delay of waiting for air to leave the material by risi g to the surface.

The impeller's holes also produce an additional inner swirl so that materials dispersed swirls up and under and through the holes inward, creating a multi-action, giving greater shearing value, and lessening dispersion time. The head of the blade is a sharp half-circle with a hook effect, designed for dissolving and shearing as well as dispersing pigments.

The disperser is completely hydraulic, requiring only two gallons of oil to operate. Compressed air is not needed. All hydraulic hoses are made of flexible steel tubing, eliminating leaks and excessive maintenance. The disperser has a variable shaft speed of from 800 to 2,400 rpm.

The machines have been carefully engineered to eliminate excessive hydraulic power. To install a disperser, all that is needed is a 220-volt line to drive the motor. It can be installed in ten minutes. The machine is manufactured in three sizes—laboratory model, 10 hp., and 20 hp. Special sizes can be made on request.

Shar Dispersion Equipment Co., Inc., Dept. PVP, 2829 James St., Fort Wayne, Ind.

DISPERSING AGENT
High Shearing Stresses

Daxad 40, a new dispersing agent which makes possible manufacture of gloss emulsion paints with a dissolver rather than pebble or roller mill, has been introduced.

Designed as a multi-purpose emulsion paint additive, the product is a solution of a polyelectrolyte dispersing agent in methanol and water. It functions as a pigment dispersant, stabilizing agent, and protective colloid.

As a protective colloid it prevents pigment agglomeration, giving gloss paints with good package stability. Its compatibility with vinyl acetate polymers makes it possible to attain superior gloss and hiding at any given pigment volume concentration.

Dewey and Almy Chemical Div., W. R. Grace & Co., Dept. PVP, Cambridge 40, Mass.

DISSOLVER
Locking Device

The "Daysolver," a new mixer, is built with a heavy-duty steel column, frame, and bridge, with oversize steel impeller shaft, to provide smooth, vibration less operation under extreme work loads.

The bridge swings in a 240° arc, which makes it possible to mix one batch with other drums of material positioned along the arc of swing, ready for mixing, thus making for practically continuous operation. A special locking device is built internally in the column, for positive locking of the arm. A hoist, operated by 80 lbs. of air pressure, cushioned at both ends of the stroke by an oil hydraulic circuit, provides rapid raising and lowering of the shaft and impeller.

A variety of impellers are available, including the newly designed Day "Turbopeller" which combines five different mixing actions to provide exceptionally fast and thorough dispersion, particularly in heavier, more viscous solutions. Two speed or variable speed drives are supplied. The "Daysolver" is available in models for every mixing application, ranging from a laboratory size model to a large, 75 horsepower unit.

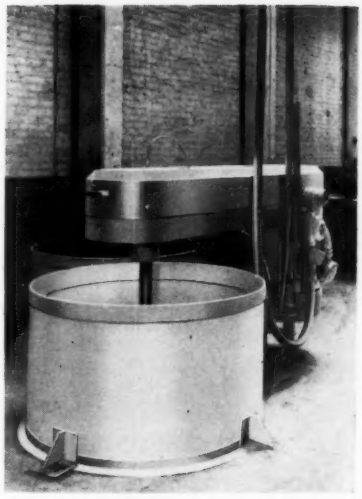
The J. H. Day Co., Dept. PVP, 4932 Beech St., Cincinnati 12, Ohio.

DISSOLVER
Space-Saving

New dissolvers, specially designed for "through-the-floor" operation to save valuable space have just been announced.

The new models may be mounted on upper floors, walkways, balconies, or other locations which permit the impeller to operate in tanks installed below floor levels. Production can be piped direct to lower areas for further processing or packaging, since many products can be completed on the dissolver without the necessity for milling.

They are designed to help in conservation of space under certain conditions, use of gravity transference of materials instead of by pumping, and simplification of processing arrangements.



MOREHOUSE-COWLES

Available in 40 to 75 H.P. sizes, they are equipped with hydraulic lifts and "MPD" (maximum power delivery) drive systems. Hydraulic lift mechanism is constructed to allow cylinder to operate through the floor, providing 66″ rise of the mixing mechanism, to clear tanks.

Drive system is capable of delivering over 90% of motor horsepower to impeller, even at slowest speeds. Speeds may be changed any time without stopping. Impeller can be swung in a 270° arc, allowing use of multiple tanks to speed operations.

Morehouse-Cowles, Inc., Dept. PVP, 1150 San Fernando Rd., Los Angeles 65, Calif.

DISSOLVER
Variable Speed System

New dissolver Model 5-VTV, has been added to the line of equipment for mixing, dispersing and deagglomerating. Basic new feature of the 5-VTV is the variable speed drive system with a range of from 1800 to 5400 rpm. and allowing for quick changes of speed while in operation.

Designed for small production, pilot plant operations and R & D facilities, the 5-VTV is especially adaptable in critical dispersing and mixing problems over a wide range of processes and materials.

New model comes equipped with the firm's unique impeller in 3 sizes, 4″, 6″ and 8″. Easily interchangeable, each impeller is especially designed for processing specific materials. Standard impellers and shafts are stainless steel.

MOREHOUSE-COWLES

Versatility and ease of operation are assured by hinge mount, permitting tilt-back through 45° for easy removal from tanks up to 20″ high. Height in lowered position is 38″. Hydraulic lift enables raising of entire assembly 11″ to maximum of 49″. Impeller will center in container up to 16″ diameter.

Capacity will depend on the nature of product and processing required. The dissolver is capable of handling a wide range of viscosities up to 50,000 centipoises in 5 to 40 gallon batches.

Morehouse-Cowles, Inc., Dept. PVP, 1150 San Fernando Rd., Los Angeles 65, Calif.

DRAIN CANS
Easily Cleaned

New drain can for draining flammable liquids from industrial drums, automotive crankcases, and other containers is now being introduced.

Top of the new drain can has a large funnel with a wide opening and perforated metal fire baffle to guard against flame or spark igniting the contents. The top is easily removed for emptying or cleaning the can. The drain can has a seamless body drawn from one-piece 24-guage terne coated steel. The body and breast are electrically welded under electronic control.

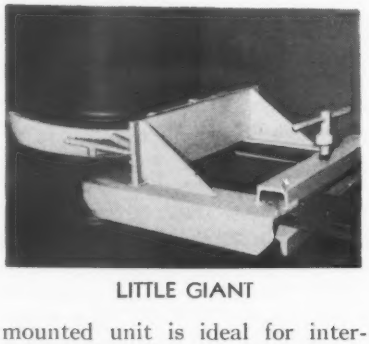
EAGLE

Eagle Manufacturing Co., Dept. PVP, 3124 Charles St., Wellsburg, W. Va.

DRUM ARMS
Apron Mounted

Drum arms handle steel drums quickly. Product can be mounted on the forks or apron of any make or model lift truck. The mechanical drum handling arms automatically pick up drums in the vertical position, one or two at a time. Drum damage is eliminated.

Apron-mounted unit is best for continuous drum handling. Fork-mounted unit is ideal for intermittent handling. Arms are excellent for narrow aisle stacking as arms take up only a few inches more space than the drums.



LITTLE GIANT

Little Giant Products, Inc., Dept. PVP, Peoria, Ill.

DRUM FILLING COVER
Corrosion-proof Cover

Dangerous and costly spillage can now be avoided with the advent of a new polyethylene drum filling cover. The need for a plastic drum filling cover that would collect and hold the overflow due to fill line breakdowns, leaky valves and careless operators caused the company to enter into experimentation and research that has now resulted in a unit that will save many packaging dollars over the year. This lightweight corrosion proof cover—available in 15, 30 and 55 gallon sizes—will fit all standard fill lines on steel, fibre and polyethylene drums. This unit, which was designed as an aid in eliminating corrosion, a saver of maintenance dollars, to protect shipping drums and to help in preventing accidents from chemicals, is molded of unbreakable, translucent natural polyethylene with built-in handles and molded pouring lip.

DELAWARE

Delaware Barrel & Drum Co., Inc. Dept. PVP, Wilmington, Del.

DRUM DUMPER
Easy Loading

New dumper line is designed to operate at lifting heights from 12″ up to 50′ emptying its contents into mixers, tanks, tumblers, chutes, conveyors, hoppers etc. Manual labor is kept to a minimum and, with the added factors of easy loading, speedy dumping, and reduced job accidents, it means appreciable savings. Rated capacities are from 100# to 5,000# dependent upon unit selected. The dumper handles powders, granuings, castings, and scrap.

Conveyors and Dumpers, Inc., Dept. PVP, Hillsdale, N. J.

CONVEYORS AND DUMPERS

DRUM HEATER
Grounded for Safety

New flexible electric drum heater for heating viscous materials and simplifying their removal has been introduced. The heaters, designed to fit any diameter steel drum from 21½" to 23½", are ideal for users of paints, oils, fats, adhesives and chemicals. The units are flexible and can be wrapped around the drum and easily attached with a simple spring attachment. Once in position, the devices will heat the drum and its contents to any desired temperature to permit easy and economical removal of the contents or maintain even temperatures when required.

The heaters are made from fully vulcanized silicone rubber, fibre glass, cloth and metal screen laminate, and are highly resistant to mechanical damage. Their flexibility permits snug wrapping of the drums even when both drum ends are restricted.

Heaters are grounded for safety. Each unit is equipped with a 6-foot cord set with grounding cap. The surface is protected electrically by the electrically grounded metal screen.

The units are factory tested at 1250 volts dielectric strength and are rated 1000 watts at 115 volts. Special sizes are available on request.

Electro-Flex Heat, Inc., Dept. PVP, 83 Woodbine St., Hartford 6, Conn.

DRUM WARMER
Eliminates Hot Spots

New, fully automatic, 5-gallon drum warmer that quickly heats viscous materials and maintains them at the temperature and consistency required for easy removal from drums has been announced.

HAROLD L. PALMER

The unit is designed to warm 5-gallon drums containing heavy-duty industrial materials such as tar, asphalt, resin, glue, mastics and adhesives, oil, grease, varnish, paint and putty, as well as more sensitive substances used commercially such as shortening, syrup, chocolate and other high-viscosity compounds. According to the manufacturer, the 5-gallon drum warmer safely and economically maintains materials at a controlled temperature on a round-the-clock basis—permitting instant removal and use regardless of surrounding temperatures. Baffled radiation eliminates hot-spots.

Additional features include: choice of two thermostatically-controlled temperature ranges, 60°—250°F., or 200°—550°F.; 2-inch sheet fiberglas insulation; aluminum reflector; wire-reinforced flexible asbestos gasket for snug fit around drum. The unit plugs into any 110-120 volt outlet, weights 22 pounds and is equipped with handles for easy portability.

Harold L. Palmer Co., Dept. PVP, 28625 Grand River Ave., Farmington, Mich.

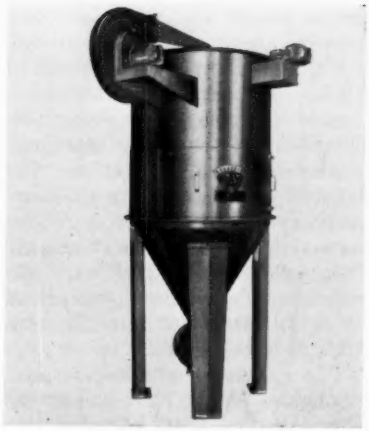
DUST COLLECTOR
Fire-resistant

A compact, low-cost industrial dust collector suitable for use in any light dust-producing operation is being produced.

The new model 301 stands only 21½" high and occupies a space 12" x 14". Because of its small size, it can be conveniently located on or under work benches. The new collector, is said to be particularly suited to dust control in electronic and other precision production as well as to any light or occasional manufacturing operation producing dust.

The dust-collecting medium in the model 301 is a highly efficient, fire-resistant, throwaway glass filter. Performance ratings under standard test conditions are: 200 cfm; velocity, 4100; static pressure, 1.7" w.g.; inlet, 3". The 301 is equipped with a 1/3 hp motor.

Torit Manufacturing Co., Dept. PVP, 1133 Rankin St., St. Paul, Minn.



DAY

DUST FILTER
Constant Back Pressure

The latest addition to the line of dust control equipment is an improved design "RJ" dust filter.

The most basic design change in this dust filter is a new, simplified method for maintaining the porosity of the filtering media. Here's how this works: a reverse air plenum (pressurized by a centrifugal blower) rotates in the top chamber of the filter. As this plenum cycles between filter sleeve openings, a "butterfly" valve is in a "closed" position and the plenum is filled with high pressure air from the centrifugal blower. As plenum centers over filter sleeve "butterfly" valve opens and high velocity, counter-flow air is discharged to remove accumulated dust from filter sleeve. Sleeves are counter-flowed one at a time, and the most recently cleaned sleeve is rendered inactive by trailing plate, thus minimizing redeposition. Plenum rotates from sleeve to sleeve where the same action takes place. By maintaining the porosity of the filter sleeves, back pressure and air volume remain constant.

The Day Sales Co., Dept. PVP, 810 Third Ave. N. E., Minneapolis 13, Minn.

ELECTRIC MICRO-GAUGE
Uses Eddy-Current Principle

Coatings of any type and thickness can now be measured quickly and accurately with a new electric micro-gauge and comparator called the *Elcotector*, now available for the first time in the U. S. In addition to measuring metallic and non-metallic coatings on any dis-

similar bases, the unit will also compare the hardness and grades of metals and other materials.

The unit operates on the eddy-current principle by making use of the fact that the electrical characteristics of a coil are influenced in proportion to the conductivity of the materials being measured. Housed in an aluminum desk-type cabinet 12″x8″x8″, the instrument may be operated at 100/115, 220/230 or 240/250 volts A.C., 50/60 cycles.

The *Elcotector* is manufactured in England by the East Lancashire Chemical Co., Ltd., which also manufactures a small pocket size thickness gauge called the *Elcometer* which measures coating thickness by the magnetic principle.

Supply Div., Dept. PVP, Corp., 4150 East 56 St., Cleveland 5, Ohio.

ELECTRIC MOTORS
Cast Iron Frames

Redesigned to meet new NEMA specifications, new dripproof general purpose motors feature fully seasoned cast iron frames with integrally cast feet to assure the highest degree of rigidity in mounting without stator distortion. These new dripproof motors are available in ratings from 1 to 150 hp; frame sizes 182 thru 505.

Other features include, solid die cast rotors with dual integrally cast cooling fans; entire rotor assembly is dynamically balanced. Product is Mylar insulated throughout for high dielectric strength and compactness. Accurately machined registers and bearing fits in the cast iron end bells. Specially designed steel baffle plates, deeply drawn, are provided in the end bells for extra protection to the windings and coils. The dripproof enclosure which provides positive protection against dirt, flying chips and dripping liquids, is furnished throughout the entire frame size range. Double width sealed ball bearings require no lubrication or other maintenance. Diagonally split cast aluminum connection boxes are equipped with cadmium plated cover screws; these roomy connection boxes may be rotated for easy connecting.

LIMA

Motors operate continuously at a rated temperature rise of 40°C. They are available for 3 or 2 phase, in all standard frequencies and commercial voltages below 600.

Lima Electric Motor Co., Inc., Dept. PVP-314, Lima, Ohio.

ELEVATING TRUCKS
All-Welded Steel Frame

New line of battery-powered portable elevating trucks that provide up to 33 per cent more load and load length capacity has been introduced.

The line includes 24 models, tripling the number of battery-powered units the company made formerly.

Twelve of the new models are rated for lifting 1500-pound loads that are up to 32-inches in length. The other 12 feature 2000-pound load capacities and 24-inch load lengths. Previously, the firm's largest elevating truck was equipped to handle a 1500-pound load capacity up to 24-inches in length.

In addition to offering greater flexibility to the user in handling more bulky and heavier loads, the new units are available at a nominal extra charge of $100 for the 1500-pound capacity models and $135 for the 2000-pound capacity trucks.

Design changes incorporated into the new trucks provide more heavily constructed forks and heavier hydraulic cylinders. An all-welded steel frame, with alloyed steel construction in the lifting channels, gives the unit excellent durability under strenuous operating conditions, according to the manufacturer.

Safety features include dual floor brakes with 12-in. braking area, plus a built-in lowering valve in the hydraulic system which eliminates the danger of sudden or rapid lowering of a load. Two heavy-duty roller leaf type chains on dual sheaves support the fork carriage.

A hydraulic drive attachment for moving 1500-pound capacity trucks is also available. Tradenamed "Load Jockey," the unit is powered by an hydraulic pump and when attached will drive a fully-loaded truck at 1¾ m.p.h.—a comfortable walking speed. It adds only 10½ in. to overall length of the truck and is equipped with important safety devices, including a control that automatically stops the truck if the operator removes his hand from it; and an automatic reversal, which enables the operator to quickly shift the truck into reverse if he should become trapped between the unit and an obstruction. A wheel guard, an optional feature that stops the truck if the guard strikes the operator's foot or other obstruction, also may be obtained.

The company offers as optional equipment on all trucks 240 amp.-hrs., 12 volt, heavy duty, industrial batteries, as well as heavy duty industrial chargers which double the operating life of the battery.

American Pulley Co., Dept. PVP, 4200 Wissahickon Ave., Philadelphia 29, Pa.

ENVIRONMENTAL CHAMBER
24-Hour Recording Chart

New mobile environmental chamber with a range from —125°F. to +350°F. has wide application in research, testing and conditioning of parts and products.

Exclusive entrance ports at the door for instrument cables eliminate the usual inconvenient feed-through ports and terminal panels. Temperatures can be lowered from +350°F. to −100°F. in 50 minutes, and raised from —100°F. to +350°F. in 30 minutes. Accuracy is plus or minus 2°.

Features include a 24-hour recording chart, interior lighting, multi-pane thermal glass assembly in the door, hermetically sealed heating elements, special safety controls, stainless steel interior, 16-gauge steel exterior with baked finish, plus six exclusive patented features.

Power requirements are 220 volts, single phase, 60 cycle; or 220 or 440 volts, 3 phase. Interior di-

mensions are 14″ x 14″ x 14″. The unit requires floor space of only 26″ x 32″.

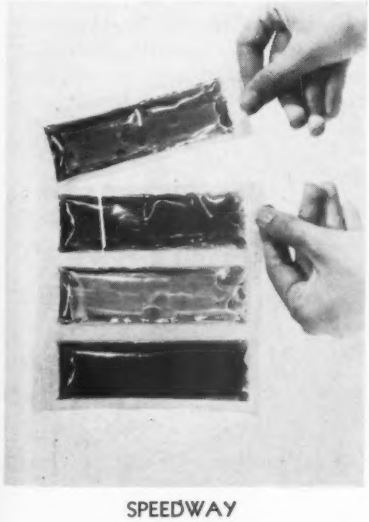
Webber Manufacturing Co., Inc. Dept. PVP, P.O. Box 217 Indianapolis 6, Ind.

FILLING MACHINE
Leak-Proof Packaging

New automatic liquid filling machine that forms, fills and seals pouch-type containers for liquids, creams and pastes is now being offered.

Known as Model LF-60, the machine forms leak-proof packages from roll stock of cellophane, foil, pliofilm, polyethylene, or laminated combinations. Package sizes range in length from 1″ to 12″, and in width from ¼″ to 8½″. Virtually any combination of single or cluster packages within this range can be produced. Adding to this versatility, a new design principle permits future die and tooling changes in less time and at lower cost than possible with any similar equipment.

Employing two independently operated packaging stations, the machine has a variable speed of 15 to 36 strokes per minute. This, with each station producing a cluster of four packages (as illustrated) for example, capacity is from 120 to 288 packages per minute. Models with single stations also are available. Since there are no electronic or other complicated parts, the unit can be operated and maintained by semi-skilled workers. Dimensions at the base are 44″ x 48″. Over-all height is 6½ feet. Power requirements are 115-230 volts, 60 cycles, single phase.



SPEEDWAY

The manufacturer will adapt the machine to fit individual needs, including the packaging of dry materials.

Speedway Machine & Tool Co., Inc., Dept. PVP, 1802 N. Luett St., Indianapolis 22, Ind.

FILLING MACHINES
Packing and Bottling

New filling units satisfy basic requirements now demanded of automatic packaging and bottling line equipment—ability to handle product and size interchange with ease and the ability to synchronize fully with other automatic units.

The rotary vacuum and gravity fillers handle free-flowing, semi-viscous and foaming liquids, filling metal, glass and plastic containers ranging in size from fractional ounces to gallons. Models available range in speeds from 40 to 400 per minute, and come equipped with from 8 to 40 spouts. Automatic overflow prevents product waste.

Container changeover—both in size or shape—poses no problem for these labelers. Adjusted in minutes, machines apply foil or paper labels of from "postage stamp" size to 6 inches wide by 7 inches long. Machines handle containers of from 1½ inches high by 1 inch dia. through 12 inches high by 7 inches dia. units. Labels are applied at speeds of from 40-150 per minute.

Both the filling and labeling machines are conveyor fed with variable speed drive to conform with other components.

For ordinarily difficult to bottle liquids, the company is also showing its latest semi-automatic gravity and vacuum fillers. They include gravity and vacuum models that are equipped to fill high viscosity or foaming liquids in metal and glass containers of from fractional ounces through gallons. Fillers are of the straight line type and may be included in conveyors of automatic or semi-automatic packaging and bottling lines.

MRM Co., Inc., Dept. PVP, 191 Berry St., Brooklyn 11, N. Y.

FILTER CARTRIDGE
Stainless Steel Core

The adaptability of the new filter cartridge to a wide range of liquid-chemical filtering applications has been increased by the availability of an optional stainless steel core.

In announcing the use of Type 304 stainless steel as core material, company spokesmen report liquid filter cartridges are now ideally suited for filtering installations where nearly any chemical or corrosive condition exists.

The cartridge, designed on an entirely new filtering principle, has been in production use for more than a year with an aluminum core and has been found to be an ideal filtering medium in all installations where chemical deterioration is not a major factor.

With the new stainless steel core, the firm's engineers have opened new horizons in industrial filtration. The new core of Type 304 stainless steel has been found through exhaustive field and production tests to offer suitable chemical resistance for almost all chemical applications.

The design of the new Afco cartridge uses custom-engineered synthetic fibers of selected diameter. Consistent cartridge density throughout the micron range is assured and because of the unique construction of the cartridge, increased solids capacity, lower pressure drop and a more uniform performance are assured.

The filter cartridges provide "depthwise" filtration rather than "surface" filtration and the filtering action takes place through the filter media bed.

American Felt Co., Dept. PVP, 2 Glenville Rd., Glenville, Conn.

FILTER HOUSING
Straight-Thru Design

Special features of a new filter housing include a straight-thru design. This feature permits the bowl to be removed from the pipe line without disturbing the pipe connections. The container design permits fabrication in a wide variety of materials with maximum cleaning ease and accessibility to all fluid passageways.

The housing is generally furnished in type 304 stainless steel, or, on special order, in an alloy to match the porous stainless steel standard elements. Corners are rounded, where possible, both inside and outside. A quick-opening closure makes removal of the bowl and replacement of the element a matter

of seconds. Housings can be designed to withstand up to 10,000 psi; 125 or 300 psig is standard.

Elements can be supplied of PSS® porous metal for use with or without a filter aid, as cylinders, bayonets, stars or in special types such as Rigimesh® corrugated sintered woven wire mesh. Filtration ratings of elements range from 2 to 55 microns nominal (98%) with absolute ratings as low as 15 microns available with certain types of elements.

Pall Corp., Dept. PVP, 30 Sea Cliff Ave., Glen Cove, N. Y.

FILTER SHEETS
Acid Treated

New filter sheets are available in ten standard grades to cover the range of millimicron particle retention. Specially formulated grades are also available for particular or unique applications. The range in particle size retention varies from 2 or 3 microns down to particle sizes so infinitesimal as to be difficult or impossible to analyze. A specific example of difficult or impossible particle size analysis would be in Pyrogens.

Filter sheets are manufactured under rigid standards to insure a constant quality of filtration and capacity. The filter sheets are acid treated and are constantly tested in our laboratory to meet our standards of low leachable calcium and iron content. As a double check, filter sheets are periodically analyzed by a reputable independent analytical laboratory.

Ertel Engineering Corp., Dept. PVP, Kingston, N. Y.

FLARING PAIL
29-Gauge Steel

A new, leakproof, 5-gallon flaring pail with a one-piece, one-seam, electrically welded body construction is now available.

The container's single, electrically welded seam provides a positive, leakproof seal making it ideal for packaging liquids such as roofing cement, paint and petroleum products as well as dry and powered products. Its predecessor, the two-piece, lock and cemented two-seam flaring pail was recommended only for dry or powdered products.

Offered in 29-gauge steel throughout (heavier gauges will follow), the new pail's body is first formed and welded into a straight sided shell. The shell is ten placed in a machine designed to stretch the metal into the flare. This new method of manufacturing the pails has never been used before in the steel container industry. Sturdy and reusable, the single-seam pail nests snugly to save shipping and storing space.

Beads near the top and bottom give a more rigid and stronger body while a compound lined bottom with a 5 thickness seam adds extra strength to the pail. The inner bottom bead prevents pails from sticking too tightly when nested in shipping and storage.

Ears are riveted to the body and doped to prevent leakage. A full skirt and deep gasket groove on the pail cover provide a sure closure and, if desired, permit the use of a gasket. The single-seam pail's body and cover are both receptive to colorful lithography.

Continental Can Co., Dept. PVP, 100 E. 42nd St., New York 17, N. Y.

FORK LIFT TRUCK
46-inch Wheelbase

Model 461 fork lift truck is equipped with hydraulically-operated unloader accessory which speeds up loading operations and the deposit of heavy loads in warehouses and storage areas by "pushing" entire load from the lift truck forks with one smooth easy motion. Wheelbase is 46 inches. Accessory does not interfere with normal operation of the lift truck.

Towmotor Corp., Dept. PVP 1226 E. 152nd St., Cleveland 10, Ohio.

FORK TRUCK
Carbon Pile Drive Control

A 4000 lb. capacity electric fork truck has been added to the company's line of battery-powered trucks.

Named the *EC-40*, the cushioned-tire, rider-type truck is equipped with carbon pile drive control, a new development which provides constantly smooth acceleration. Working through a hydraulic circuit, carbon pile control permits steady, stepless acceleration for "inching" operations, where loads must be placed delicately.

High torque, required for fast acceleration, is provided by dual field series windings in the drive motor. Dual fields improve efficiency of operation throughout entire speed range.

To facilitate maintenance, the contactor panel is located in the truck's counterweight and is protected by a steel cover. Easily detachable hood and side plates permit top and side removal of battery. Drop-down covers expose carbon pile resistor and hydraulic pump. Floorboard of truck can be readily removed to expose other internal parts.

Fully loaded the *EC-40* can climb a ten per cent grade, and can travel up to 6.2 mph forward or reverse. With standard upright, its lift speed loaded is 36 fpm and lowering speed is 70 fpm.

Standard nested roller uprights are used on the new model although a triple stage upright is available as optional equipment.

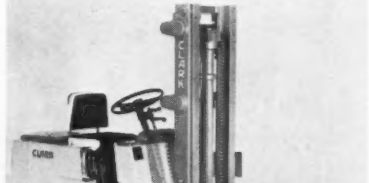
Dimensions of the *EC-40* are: overall length with 40-inch forks, 117-3/8 inches; wheelbase, 47 inches; width, 38 inches; aisle for right angle stacking, 82½ inches plus load length; weight, with 36-volt battery, approximately 7850 lbs.

Industrial Truck Div., Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

FORK TRUCK
Pneumatic Tires

New 2000 lb. capacity, gas-powered fork truck equipped with pneumatic tires has been introduced.

Designated the CY 20, the truck is designed for outside operation over gravel and semi-paved surfaces. It is equipped with pneu-



CLARK

matic 6.50 by 10 drive and steer tires on a 54-in. wheelbase. Dual drive tires and wide profile tires (2.. by 8.00) for extra flotation are available as optional equipment.

The CY 20 is powered by a 49 hp engine which has a displacement of 162 cu. in., and develops 12. lb-ft torque. The unit will start and stop on a 37.5 per cent grade with a 2000 lb load.

On both models, lift speed loaded is 74 fpm and empty 91 fpm. Upright channels are rolled from SAE 1045 fine grain steel. Nested inner upright travels on life-time lubricated rollers which provide continuous roller contact.

Lift and tilt of the upright is controlled from one lever mounted on right side of steering column, which enables operator to lift and tilt simultaneously.

Industrial Truck Div., Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

FURNACE ACCESSORIES

Safety Handle

New functional accessory groups that let one model electric furnace perform several operations has been announced. The following accessories make the Type 2100 furnace even more adaptable and versatile than before as a salt bath, oil bath, melting, vertical muffle or crucible furnace, the company claims: two special-alloy stainless steel pots with cover for liquid heating to 1000°F. and 1600°F., a safety lifting handle for the pots, a perforated stainless steel small parts basket with lifting handle, a perforated stainless steel skimmer for removing sludge or crust, a graphite melting ladle for use to 1700°F. with unique no-slip lifting handle, a high-temperature refractory chamber liner, and a heavy refractory chamber cover.

Thermo Electric Mfg. Co., Dept. PVP, 559 Huff St. Dubuque, Iowa.

GAS BURNER

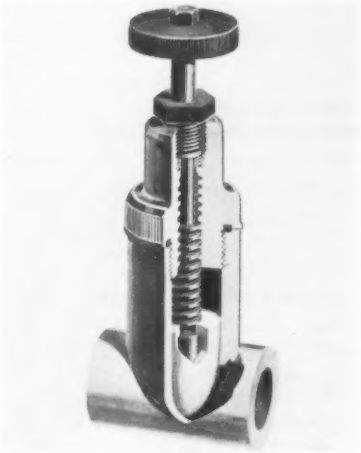
Alloy and Cast Iron

New, high-radiation type "H" burner is designed to provide from 150 BTU to 3,000 BTU per linear inch, depending upon gas-air mixture supplied. The heat release is the equivalent of from 45 to 900 watts per linear inch. Energy cost with this new burner is only a fraction of equivalent electrical energy cost. Combustion takes place completely within the fluted refractory, which attains operating temperatures to 2600°F. when operated in the open.

The burner is particularly suitable for oven, conveyor, rotary drum and roll dryer applications.

Burner is available in two types: one, an alloy for the elevated temperatures, the other, of cast gray iron for open applications. Burners can be made in any desired lengths from 7″ to 100 feet or more.

Red-Ray Mfg. Co., Inc., Dept. PVP, 318 Cliff Lane, Cliffside Park, N. J.



VANTON

GATE VALVES

High Strength

New polypropylene throttlable gate valves are light in weight, have high strength and chemical resistance. They possess excellent resistance to most solvents, greases, oils and the majority of common acids at temperatures up to 185°F.

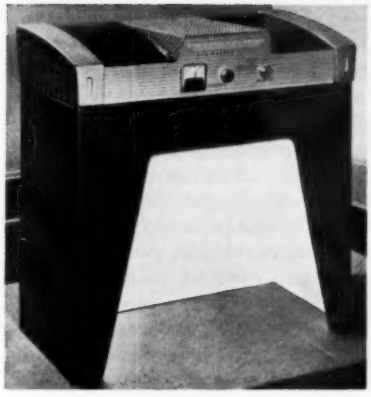
The polypropylene throttlable gate valves are available from stock in sizes from ½″ to 2″ with socket-weld, flanged or screwed ends and combine the features of straight through no pressure drop flow with close throttling control which places them amongst the most versatile plastic valve products now available.

Vanton Pump & Equipment Corp., Dept. PVP, Hillside, N. J.

GENERATOR

Reconstructs Natural Daylight

Accurate comparison of colors and color identification can be accomplished the firm says, only with a scientifically engineered instrument designed for this purpose.



GAMAIN

New generator is designed to reconstruct natural daylight so that colors can be correctly appreciated or compared under a light which possesses all the daylight radiations in proper proportions, quantities and qualities.

The spectral distribution of daylight has been accurately measured by the firm's engineers and is scientifically applied to all of the various light sources available with this new generator. These light sources are accomplished by use of incandescent, blue fluorescent, daylight fluorescent, and color filters which are all blended by manual control to duplicate the desired type of artificial daylight. Black light (ultra-violet) is also used to check the quality of bleach of white materials and for inspection of materials treated to fluoresce.

It is important to have the many variations of artificial light that can be produced by the new generator. With these various settings, colors can be compared for color matching and for appearance in artificially lighted homes, offices, stores, factories as well as in natural daylight.

The Gamain Co., Dept. PVP, 5th and Richmond, Kansas City, Kansas.

GLASS DIAPHRAGM VALVES

Corrosion Resistant

"Solidex" valves of high quality borosilicate glass with a Teflon diaphragm are available.

The rugged, corrosion resistant, easy to service glass valves are made in both angle and straight through models to fit 1″, 1½″ and 2″ glass pipe. They are effective from a vacuum of 10 mm. of mercury to a positive pressure of 30 p.s.i.g.

of seconds. Housings can be designed to withstand up to 10,000 psi; 125 or 300 psig is standard.

Elements can be supplied of PSS® porous metal for use with or without a filter aid, as cylinders, bayonets, stars or in special types such as Rigimesh® corrugated sintered woven wire mesh. Filtration ratings of elements range from 2 to 55 microns nominal (98%) with absolute ratings as low as 15 microns available with certain types of elements.

Pall Corp., Dept. PVP, 30 Sea Cliff Ave., Glen Cove, N. Y.

FILTER SHEETS
Acid Treated

New filter sheets are available in ten standard grades to cover the range of millimicron particle retention. Specially formulated grades are also available for particular or unique applications. The range in particle size retention varies from 2 or 3 microns down to particle sizes so infinitesimal as to be difficult or impossible to analyze. A specific example of difficult or impossible particle size analysis would be in Pyrogens.

Filter sheets are manufactured under rigid standards to insure a constant quality of filtration and capacity. The filter sheets are acid treated and are constantly tested in our laboratory to meet our standards of low leachable calcium and iron content. As a double check, filter sheets are periodically analyzed by a reputable independent analytical laboratory.

Ertel Engineering Corp., Dept. PVP, Kingston, N. Y.

FLARING PAIL
29-Gauge Steel

A new, leakproof, 5-gallon flaring pail with a one-piece, one-seam, electrically welded body construction is now available.

The container's single, electrically welded seam provides a positive, leakproof seal making it ideal for packaging liquids such as roofing cement, paint and petroleum products as well as dry and powered products. Its predecessor, the two-piece, lock and cemented two-seam flaring pail was recommended only for dry or powdered products.

Offered in 29-gauge steel throughout (heavier gauges will follow), the new pail's body is first formed and welded into a straight sided shell. The shell is ten placed in a machine designed to stretch the metal into the flare. This new method of manufacturing the pails has never been used before in the steel container industry. Sturdy and reusable, the single-seam pail nests snugly to save shipping and storing space.

Beads near the top and bottom give a more rigid and stronger body while a compound lined bottom with a 5 thickness seam adds extra strength to the pail. The inner bottom bead prevents pails from sticking too tightly when nested in shipping and storage.

Ears are riveted to the body and doped to prevent leakage. A full skirt and deep gasket groove on the pail cover provide a sure closure and, if desired, permit the use of a gasket. The single-seam pail's body and cover are both receptive to colorful lithography.

Continental Can Co., Dept. PVP, 100 E. 42nd St., New York 17, N. Y.

FORK LIFT TRUCK
46-inch Wheelbase

Model 461 fork lift truck is equipped with hydraulically-operated unloader accessory which speeds up loading operations and the deposit of heavy loads in warehouses and storage areas by "pushing" entire load from the lift truck forks with one smooth easy motion. Wheelbase is 46 inches. Accessory does not interfere with normal operation of the lift truck.

Towmotor Corp., Dept. PVP 1226 E. 152nd St., Cleveland 10, Ohio.

FORK TRUCK
Carbon Pile Drive Control

A 4000 lb. capacity electric fork truck has been added to the company's line of battery-powered trucks.

Named the *EC-40*, the cushioned-tire, rider-type truck is equipped with carbon pile drive control, a new development which provides constantly smooth acceleration. Working through a hydraulic circuit, carbon pile control permits steady, stepless acceleration for "inching" operations, where loads must be placed delicately.

High torque, required for fast acceleration, is provided by dual field series windings in the drive motor. Dual fields improve efficiency of operation throughout entire speed range.

To facilitate maintenance, the contactor panel is located in the truck's counterweight and is protected by a steel cover. Easily detachable hood and side plates permit top and side removal of battery. Drop-down covers expose carbon pile resistor and hydraulic pump. Floorboard of truck can be readily removed to expose other internal parts.

Fully loaded the *EC-40* can climb a ten per cent grade, and can travel up to 6.2 mph forward or reverse. With standard upright, its lift speed loaded is 36 fpm and lowering speed is 70 fpm.

Standard nested roller uprights are used on the new model although a triple stage upright is available as optional equipment.

Dimensions of the *EC-40* are: overall length with 40-inch forks, 117-3/8 inches; wheelbase, 47 inches; width, 38 inches; aisle for right angle stacking, 82½ inches plus load length; weight, with 36-volt battery, approximately 7850 lbs.

Industrial Truck Div., Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

FORK TRUCK
Pneumatic Tires

New 2000 lb. capacity, gas-powered fork truck equipped with pneumatic tires has been introduced.

Designated the CY 20, the truck is designed for outside operation over gravel and semi-paved surfaces. It is equipped with pneu-

CLARK

matic 6.50 by 10 drive and steer tires on a 54-in. wheelbase. Dual drive tires and wide profile tires (23 by 8.00) for extra flotation are available as optional equipment.

The CY 20 is powered by a 49 hp engine which has a displacement of 162 cu. in., and develops 123 lb-ft torque. The unit will start and stop on a 37.5 per cent grade with a 2000 lb load.

On both models, lift speed loaded is 74 fpm and empty 91 fpm. Upright channels are rolled from SAE 1045 fine grain steel. Nested inner upright travels on life-time lubricated rollers which provide continuous roller contact.

Lift and tilt of the upright is controlled from one lever mounted on right side of steering column, which enables operator to lift and tilt simultaneously.

Industrial Truck Div., Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

FURNACE ACCESSORIES
Safety Handle

New functional accessory groups that let one model electric furnace perform several operations has been announced. The following accessories make the Type 2100 furnace even more adaptable and versatile than before as a salt bath, oil bath, melting, vertical muffle or crucible furnace, the company claims: two special-alloy stainless steel pots with cover for liquid heating to 1000°F. and 1600°F., a safety lifting handle for the pots, a perforated stainless steel small parts basket with lifting handle, a perforated stainless steel skimmer for removing sludge or crust, a graphite melting ladle for use to 1700°F. with unique no-slip lifting handle, a high-temperature refractory chamber liner, and a heavy refractory chamber cover.

Thermo Electric Mfg. Co., Dept. PVP, 559 Huff St. Dubuque, Iowa.

GAS BURNER
Alloy and Cast Iron

New, high-radiation type "H" burner is designed to provide from 150 BTU to 3,000 BTU per linear inch, depending upon gas-air mixture supplied. The heat release is the equivalent of from 45 to 900 watts per linear inch. Energy cost with this new burner is only a fraction of equivalent electrical energy cost. Combustion takes place completely within the fluted refractory, which attains operating temperatures to 2600°F. when operated in the open.

The burner is particularly suitable for oven, conveyor, rotary drum and roll dryer applications.

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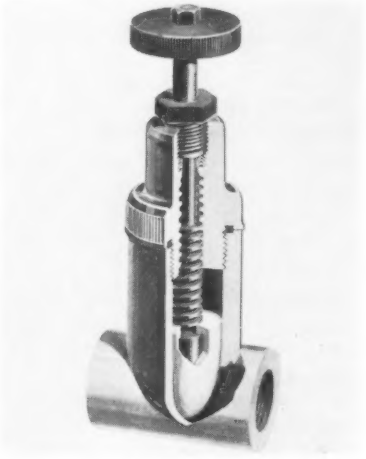

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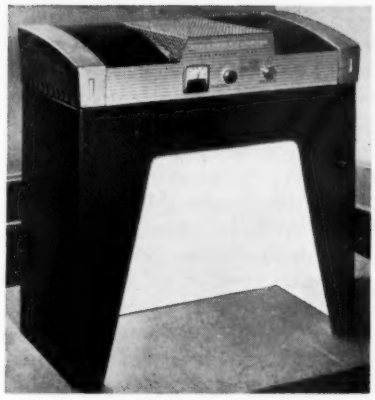

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"Solidex" valves of high quality borosilicate glass with a Teflon diaphragm are available.

The rugged, corrosion resistant, easy to service glass valves are made in both angle and straight through models to fit 1″, 1½″ and 2″ glass pipe. They are effective from a vacuum of 10 mm. of mercury to a positive pressure of 30 p.s.i.g.

The high quality borosilicate glass is annealed to withstand 200°F. instantaneous thermal shock and 400°F. operating temperature.

Liquids flowing through the valve can come in contact with only two materials—the glass body and the Teflon diaphragm. Flow is controlled by the movement of the diaphragm in relation to its ground glass seat.

Solidex valves are recommended for use in glass laboratory, pilot plant and production installations and provide a simple, versatile, inexpensive way to control the flow of all liquids except hydrofluoric acid and hot alkalies.

Porter Engineering Co., Dept. PVP, 1513 W. Orvilla Rd., Hatfield, Pa.

GUMMED LABELS
No Pre-Sticking

New gummed labels printed on prone paper stock, is reportedly completely unlike ordinary paper stock. It handles and stores just like plain paper. It has a "relaxed" quality so that it lies flat without pre-sticking or curling through extreme variations of temperature and humidity. Yet it has sufficient body and bulk to handle well in a labeling machine.

The firm offers labels printed on this remarkable paper in product-identifying and standard address types. Available are a variety of finishes, single and multi-colors, plain or varnished.

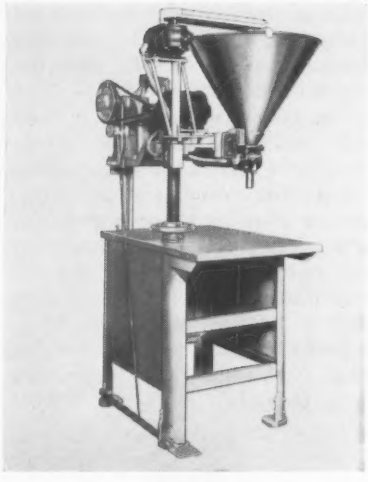
Kalamazoo Label Co., Dept. PVP, 321 W. Ransom St., Kalamazoo, Mich.

HAND CREAM
Protects Against Chemicals

New development in skin protection called "Glovs," is said to protect the skin against the harmful effects of harsh chemicals in paint and lacquer.

Packaged in easily handled, unbreakable plastic jars, "Glovs" is more economical, safer and more effective than any other type of protective covering for the hands, the company says. Daily use of the cream can prevent drying and cracking of the skin. Product can be safely used over cuts, abrasions and sores.

National Lacquer and Paint Co., Inc., Dept. PVP, 7415-39 S. Green St., Chicago 21, Ill.



ELGIN

HAND FILLER
Reservoir or Manifold Feed

New, compact hand filler easily adapted to a broad range of liquid or viscous products and ideal for "Boil-in-Bag" filling has just been introduced.

An adaptation of the automatic "Single Valve Filler," the machine represents the company's entry into the manufacture of hand feed equipment specifically designed to meet today's increasing number of special filling needs.

Featuring single revolution clutch, the unit is precision designed for faultless delivery of products in the food, paint, cosmetic and oil industries. Covering a large range of container sizes up to 32 ounces, it can also be equipped with special size cylinders and pistons for larger or smaller capacities.

Plants with low or moderate production or frequent change-over of products will find this new machine particularly versatile. Quick and easy to clean, the unit is perfect where a variety of products and different sizes and shapes of containers must be used, he said.

Occupying minimum floor space of only 24 x 36 inches, the machine is available with a reservoir or manifold feed. An agitator can be inserted in the reservoir for products that require it.

Elgin Manufacturing Co., Dept. PVP, 200 Brook St., Elgin, Ill.

HAND TRUCKS
Lightweight

New line of low-cost hand trucks,

AMERICAN PULLEY

constructed of lightweight tubular steel, was announced. The two-wheeled trucks are designed for increased versatility in handling heavy goods, and are said to be ideal for small retail operations and light delivery trucks.

Called the "Kase-King," the new line offers models weighing from 18 to 28 pounds. Four of its five models feature removable semi-pneumatic and cushion tread wheels of different sizes which can be changed quickly to adapt to on-the-job situations. Wheel sizes are available in diameters of six, eight and ten inches. Three axle positions on the trucks make possible the quick-change operation.

Kase-King's heavy duty skid bars are reinforced at points of stress and will facilitate stair and curb climbing. With a capacity of 400-pounds and tipped-top bar handle, Model KP is the basic unit of the line. Models KP-1 and KP-2 offer the same features—with single pistol-grip handle and two bent-handle grips, respectively.

Model KP-0, or open frame model is made without cross-bars and center strap. Its low cost and light weight makes it especially applicable for beverage case handling.

The utility truck model is the lightest and lowest in cost of the Kase-King line. Fitted with standard five-inch solid rubber wheels, it has a 200-pound capacity and is suitable for moving goods over single-level areas.

All frames are double-dipped in red enamel to protect the metal against rust and hard use.

American Pulley Co., Dept. PVP, 4200 Wissahickon Ave., Philadelphia 29, Pa.

HANSA YELLOW PIGMENTS
Improved Durability

New light resistant hansa yellow pigments developed for use in exterior latex paints have recently been introduced. They are Permansa Yellow L Lemon shade 12186, Permansa Yellow R Medium shade 12185 and Permansa Yellow RA Medium shade 12187.

These new pigments with their improved durability fill the need for more light resistant hansa yellows created by the increased use of latex paints in exterior applications. The chrome yellows are not bright enough and contain lead; vat yellows are too expensive; and conventional hansa yellows are not light resistant enough.

Pigment, Color and Chemical Div., Sherwin-Williams Co., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

HEXAMETHYLENETETRAMINE
Low Odor

Hexamethylenetetramine, available under the name "Ucar hexa," serves as a convenient, low-odor source of anhydrous formaldehyde.

Hexamethylenetetramine reacts chemically as formaldehyde, but without liberation of water. This property eliminates the undersirable irritating odor that is characteristic of formaldehyde in water solutions. The widest use of Ucar hexa is as a cross-linking agent in novolac resins to make dry mixes for molding, fiber-bonding, grinding-wheel, and foundry applications. It is also used in novolac varnishes for cross-linking when the dried resins are heated. These varnishes are useful for impregnating paper and fabrics for laminates and high-strength molding applications. Ucar hexa can also be used both in the manufacture and curing phenolic resins as well as an alkaline catalyst replacement for ammonium hydroxide in the production of one-step, phenol-aldehyde resins.

It is also an insolubilizing agent and hardener for adhesives, coatings, and finishes based on proteins such as animal glue, casein and soya. It serves as a corrosion inhibitor during acid pickling of ferrous metals, as a rubber accelerator, as an acidity deactivator for inert carriers in Endrin insecticide dusts, as a starting material for cyclonite (RDX)- and other high explosives, and to form chemical complexes with phenolic compounds in solvent purification of petroleum streams.

Product is available in four grades—powdered or crystalline, with or without a free-flow agent.

Union Carbide Chemicals Co., Dept. PVP, 270 Park Ave., New York 17, N. Y.

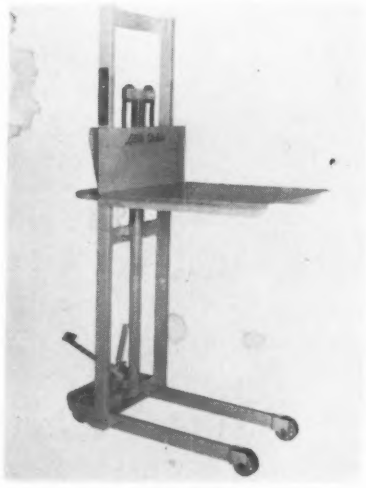
HYDRAULIC LIFTER
One-Man Use

Featuring foot operation, new hydraulic lifter, the Model FPD Little Dickie needs minimum foot effort for lifting loads up to 750 pounds (1,000 pound test). Lifting to a height of 64" above floor level, the unit frees high-rate power equipment for bulk handling operations.

Because of the hydraulic system, the unit is safe in operation, with fluid pressure holding the load, rather than an operator, as in a mechanical system. No lifting handle or open gears are incorporated into the unit that constitute a danger from clothing catching during operation.

Optional equipment includes a floor lock for applications where conditions require it, floor protective wheels and pipe runners to assist loading onto trucks.

Whether load is raised or lowered, Little Dickie features tight maneuverability, easily controlled by one man. It finds application as a warehouse utility lift and transport truck, in tiering, stacking, breaking down piles and loading. It lowers or lifts from or to dock and street level and makes an ideal stock positioner in cutting, milling, sawing and similar operations. It also serves as a transporter for such items as dies, jigs, molds, castings, index heads and other tools.



LANGLEY

Masts and base are high strength-to-weight-ratio steel tubing, with mast and frame arc-welded into a single unit, giving it light weight with a high safety factor. Lifting speed is one inch per stroke under full load conditions.

Weighing only 204 pounds, Model FPD is painted a bright safety yellow for maximum visibility under all lighting conditions. It easily can be lifted onto a truck for transport to and from application areas.

Langley Manufacturing Co., Inc., Dept. PVP, 913 Cambridge St., Cambridge 41, Mass.

ISANO OIL
Checks Fire Spread

Durable fire retardancy both inside and outside of combustible buildings is now a reality. The spread of flames can be checked with intumescent paints — paints that puff on heating to form an insulating layer so effective that the fire is retarded.

These paints contain Isano Oil, which, when heated, has the unusual property of giving off a gas that expands the paint film. This expanded insulating paint film remains intact over the surface, keeping the air away and the temperature of the substrate down. This property is found in no other commercial oil.

Most intumescent paints are partially water soluble and are prone to loss of their puffing qualities when exposed to weather. The intumescent paints containing Isano Oil, however, are ready to act instantly to check the spread of fire year after year. Reports of exposure data indicate that there was no loss of fire retarding properties on this paint when exposed outdoors for two and one half years. In addition, this paint protected the building from normal weathering as well as a conventional house paint does. No other intumescent paint is known to be as weather resistant.

Isano Oil, also known as Boleko

Oil, recently has become commercially available in large quantities.

Pacific Vegetable Oil Corp., Dept. PVP, 1145 So. Tenth St., Richmond, Calif.

LAB OVEN
Reduction Gear

Laboratory or production workers requiring extra precision control of heat uniformity will appreciate a new rotary shelf laboratory oven. The rotary shelves, either manually or mechanically operated are spaced on 12-inch vertical centers. The maker recommends manual operation for temperatures below 300°F. For higher temperatures to the oven maximum of 850°F., there is a motor and reduction gear provided to maintain constant shelf rotation.

Even without a rotary shelf this model maintains heat uniformity within ±1°C. throughout the work chamber. The addition of the rotary shelf is said to give identical heat to every product placed on the shelves.

Other features of this series include hinged plug-type doors located within one main door on same level as rotary shelf for easy removal of product. Each door is provided with heat resistant glass window.

Despatch Oven Co., Dept. PVP, 619-8th St., S.E., Minneapolis, 14, Minn.

LABEL PRINTER
Quick Plate Changing

A small, inexpensive label printer and die cutter for factory and office use is being offered.

The machine prints and die cuts in one operation on pressure sensitive, gummed, heat seal or tag stock, as well as foil and fabric. The rubber printing plate is set inside a rotary die, giving exact registration. Change of plates and colors is said to be quickly effected. The machine has given considerable savings for short runs.

The Paxon Co., Dept. PVP, 1265 Broadway, New York 1, N. Y.

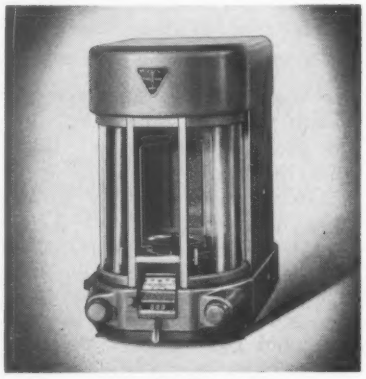
LABORATORY BALANCE
High Sensitivity

High capacity (up to 6 kilograms), high sensitivity (0.1 gram), and a very sturdy all-aluminum case are the features of a new line of multi-purpose balances.

Two models are offered: 195-B has a sensitivity of 0.1 g., capacity of 3 kg. (7 lb), tare capacity of ¾ lb., beam graduated to 100 g., 50 g., or 8 oz. Model 2-89B has capacity of 6 kg. with beam graduated to 500 g., 100 g., or 16 oz.

Both models are set in a heavy aluminum case with chemical-resistant blue-gray finish. Both have an easy-reading angled pointed in a protective tower, stainless steel pans or plates, and a tare beam for simplifying measurement of net contents of containers. Dimensions: 16¾″ long, 6-1 8″ wide, 8″ high.

Henry Troemner, Inc., Dept. PVP, 22nd & Master Sts., Philadelphia 21, Pa.



C. H. STOELTING

LABORATORY BALANCE
Weight Placing System

The "FW 55" high speed laboratory balance combines a direct reading electro optical scale with an automatic weight placing system operated by two dials. The long optical scale of 10,200 mg (10.2 gr.) gives the "FW 55" a performance capability of a speed at least three times as fast as other analytical balances in its class. The dials, pan, and read out scales are located in the same line of vision, to eliminate fatigue when the balance is used continuously.

C. H. Stoelting Co., Dept. PVP, 424 N. Homan Ave., Chicago 24, Ill.

LABORATORY OVEN
Automatic Controls

New design achieves dependable heat control accuracy up to 550° F. in a low cost electric laboratory oven.

The Model 203-6 oven is built to accommodate many heat applications in the low heat range. It is built to use minimum floor space. Only 27″ x 22″ on small models constructed so that ovens can be stacked one upon another, to achieve more than one heat simultaneously in limited laboratory space.

The oven is equipped with automatic control. It requires minimum attention. High velocity fan diffuses heated air evenly and completely through the work chamber to maintain high heat uniformity in the chamber. Circuit breaker protects motor from possible damage. Complete insulation reduces heat loss to minimum and asbestos gasket seals door and oven to make the 203-6 a reliable oven for heat testing and such other uses as sterilizing, drying and curing, and aging processes, also for preheating plastic materials.

This ruggedly built oven is finished in practical baked gray enamel. Strong steel strap hinges support a sturdy door. A steel control box protects controls from dirt and damage. Ovens have hinged handles on both sides for convenience when moving oven. Heating system located at bottom of oven is low gradient type open coil. 1500 watts, either 110 volts 1/60 AC or 220 volts 1/60 AC. Heat up time from room temperature to 550° only 45 minutes with empty chamber.

Despatch Oven Co., Dept. PVP, 619 S. E. Eighth St., Minneapolis 14, Minn.

LATEX PAINT BINDER
Packaging Stability

Latex X-3339 is offered for the improvement of interior latex paint. According to the manufacturer, the new latex does not require thickener-stabilizer. The ability to use highly efficient synthetic thickeners carries with it added advantages such as minimum bacterial protection and excellent packaging stability. According to the firm, the new latex means simplified formulations because large amounts of preservatives and stabilizers are unnecessary.

Dow Chemical Co., Dept. PVP, Midland, Mich.

LEAD PIGMENT
Corrosion-Resistant

New treatment of standard leafed

metallic lead pigment has been developed. A stearic-free dry flake metallic pigment form (Mark V) of the ductile metal now makes possible the use of the excellent corrosion resistant properties of virgin leafed metallic lead in epoxy based systems. The resulting epoxy compositions can be applied by trowel, brush, or spray depending on the need of the user. In addition to the standard maintenance applications, excellent results have been obtained in chemical plant service as well as for the shielding of nuclear and x-ray installations.

Metalead Products Corp., Dept. PVP, 2901 Park Blvd., Palo Alto, Calif.

LIQUID STABILIZER
Corrosion-Resistant

Development of "Can-Gard AC-83," the first effective stabilizer and inhibitor for liquid shellac has been announced. The action of Can-Gard is said to be twofold. It prevents can corrosion and the slow drying which normally develops rapidly. Shellac which has been stored for as little as four months under very warm conditions may cause cans to corrode. The resulting iron contamination will blacken oak floors. Slow drying and formulation instability are common complaints.

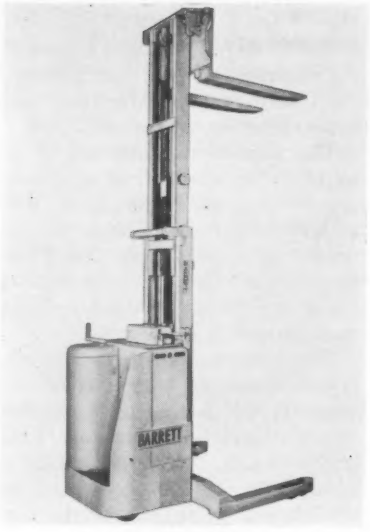
The elimination of shellac instability benefits the consumer, dealer, industrial formulator and the manufacturer.

Acme Shellac Products Co., Dept. PVP, Newark, N. J.

LIFT TRUCK
Narrow Aisle Stacking

New 24-volt lift truck is now available. This truck, called the Model RST, is designed for narrow aisle stacking of pallet loads from 1000 to 4000 pounds.

Controls are placed conveniently to enable the driver to maneuver and handle capacity loads with speed and efficiency. Steering is controlled by his left hand. A single right hand lever controls both forward or reverse travel, and fork lifting or lowering. Twisting the lever forward or back governs travel through 4 speeds forward and 4 speeds reverse. Raising or pushing down on the lever lifts or lowers forks.



BARRETT-CRAVENS

The new gear drive in the RST is designed as a single package unit for space economy and top efficiency. The drive wheel, transmission, drive motor and brake are mounted vertically in line with the steering lever. The entire drive mechanism is easily accessible and may be removed from the truck chassis by unscrewing four bolts.

A dead-man type brake is actuated by a foot pedal in the rider platform and is held in release position by the driver's foot. The brake is applied when the driver raises his foot. This is an added safety factor when the truck is left standing unattended, even with a capacity load on the forks.

The large drive wheel is rubber tired. Both load and caster wheels are of tough Barathane material.

Barrett-Cravens Co., Dept. PVP, 628 Dundee Rd., Northbrook, Ill.

LOAD GRAB
Grips 2 or 4 drums

New side shift load grab with grip-o-lift arms is now available.

The Spacemaster Model "J" equipped with a cascade side shift load grab and little giant grip-o-lift arms can handle unit loads with or without pallets. In the clamping position they grip two or four drums, heavy cartons, or bales.

By lifting the pin, the arms lay flat and can be used as forks to handle pallets. With the side shift load grab exact positioning of loads can be obtained.

Gripping surface is hard, smooth rubber bonded to steel sheets screwed to ¼" steel plates. These sheets can be quickly removed and replaced in a few minutes.

Lewis-Shepard Products, Inc., Dept. PVP-R9-34, 125 Walnut St., Watertown 72, Mass.

MAGNETIC STIRRER
Quiet Operation

A new magnetic stirrer capable of mixing and stirring solutions in as many as six vessels at one time has been announced.

A new feature of the unit, called Synchro-Drive, solves the problem of stirring several vessels simultaneously, at the exact same speeds, the company announced. It also assures quiet operation.

The unit is named "Multi-Magnestir" and it can stir up to six vessels, each of 1000 ml. capacity, at predetermined speeds for indefinite periods of time and give identical agitation for each vessel.

The single unit construction, of heavy gauge aluminum, reduces bench space up to 50 per cent—measures only 18" x 12" x 7". Up to six vessels—each six inches in diameter—can be accommodated or larger, individual vessels. Local interference from magnetic attraction is eliminated.

The "Multi-Magnestir" has a 1/20 HP motor, lubricated for life. The unit has an Ohmite rheostat, which gives variable stirring action from slow mixing to high-speed agitation.

Labline, Inc., Dept. PVP, 3070 W. Grand Ave., Chicago 22, Ill.

METHYL ISOAMYL KETONE
High Dilution Ratio

Methyl isoamyl ketone is now available in commercial quantities. Methyl isoamyl ketone reportedly represents the most economical, high-boiling solvent (145.4°C.) for vinyl and nitrocellulose lacquers.

Its higher dilution ratio as compared with the other high-boiling solvents being used in these applications also provides added savings in formulating costs. Methyl isoamyl ketone contributes lower viscosities, has a high relative evaporation rate, and offers excellent blush resistance.

Union Carbide Chemicals Co., Dept. PVP, 30 East 42nd St., New York 17, N. Y.

METHYL ISOAMYL KETONE
Promotes Leveling

Methyl isoamyl ketone (MIAK), a high solvency retarder solvent for many resins, is now available commercially.

As a retarder solvent, MIAK promotes leveling and flow-out, and offers excellent blush control. Yet is has minimum retention in lacquer films since it is not as slow evaporating as many solvents of this type.

MIAK is also unique in that unlike most retarder solvents, its high solvent power allows formulation at a high solids content while maintaining a low solution viscosity.

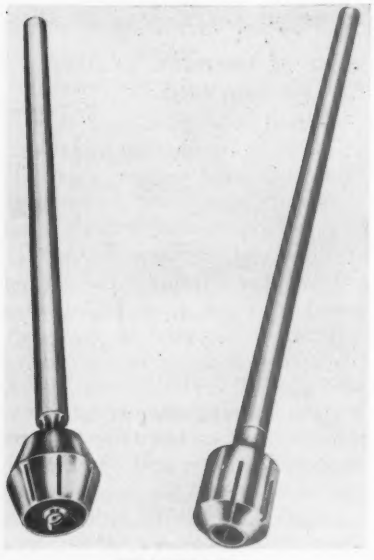
Firm anticipates that this new addition to its line of solvents will find wide use as a replacement for many medium boiling solvents in formulations with nitrocellulose, ethyl cellulose, acrylic resins, half-second Butyrate, and vinyl copolymers.

Eastman Chemical Products, Dept. PVP, Kingsport, Tenn.

MIXERS
Micro-Shear Head

New high speed mixers, the Dispersators, are featuring a new head offering high intensity shearing and dispersion. Available in both simplex and duplex versions, the new head has been termed "Micro'-Shear."

Premier Mill Corp., Dept. PVP, 224 Fifth Ave., New York 1, N. Y.



PREMIER MILL

MIXERS
3600-8000 RPM

A complete line of highly versatile mixers for the laboratory and for production, is now available.

The models range from ¼ hp to 15 hp sizes, ranging in mixing capacities from 3 gallons to 3000 gallons. Each model may be converted in seconds from closed turbine to open turbine mixer, or vice versa, providing a dual application mixer in a single unit.

The mixers mix, blend, disperse and homogenize materials of any viscosity which can be pumped or forced through the mixing head of the mixer. At shaft speeds of up to 8000 rpm for the laboratory models and 3600 rpm for the production units, the rotors create tremendous forces of shear and impact as the material being processed is forced between the rotor and stator as it moves through the mixing head.

The distance between the rotor and the stator can be readily changed to decrease or increase the degree of shear and impact to which the material is subjected in the mixing head. Excessively viscous, gelatinous or highly thixotropic materials can be readily processed by removing the stator sleeve and operating the unit as an open turbine mixer.

The mixers are designed to draw the material being processed from below and to force it upward through the restricted jet openings of the mixing head without forming a vortex.

Barrington Industries, Inc., Dept. PVP, 185 Union Ave., Providence, R. I.

MULLER
400-Pound Capacity

New muller is designed for batch mixing of a wide variety of dry and semi-dry products such as paint pigments, foundry sands, chemicals, food stuffs, fertilizers, ceramics, plastics, grains and feeds, and similar materials. It has a rated capacity of up to 400 pounds and in the months of field testing to which it has been subjected has more than proved its ability to do a fast job of mulling.

Other features cited by the company of the new muller are:

(1) A low silhouette—it stands only four feet high and is easy to load;

(2) It is compact—occupies only seven square feet of floor space;

(3) It is fast—mixes a 400 pound load in less than 1 minute, discharges as fast as an operator can handle;

(4) It is rugged—solidly constructed of heavy duty materials for a long lifetime;

(5) It is maintenance free—simplicity of design eliminates maintenance problems.

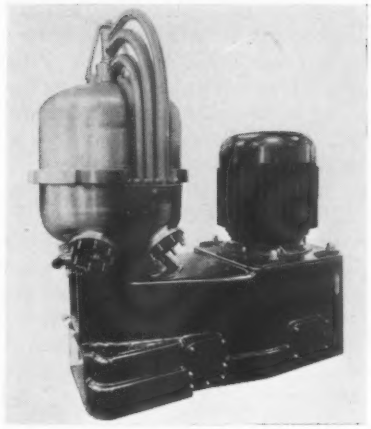
STEVENS

Frederic B. Stevens, Inc., Dept. PVP, 18th St., Detroit 16, Mich.

NOZZLE-BOWL CENTRIFUGE
Adjustable Motor Base Plate

New nozzle-bowl centrifuge for high pressure and high temperature operation, has been introduced. Designated the QX-312, this centrifuge may be used as a solids concentrator, liquid clarifier or solid particle classifier. This unit can handle up to 450 gpm at temperatures to 300°F. and pressures to 125 psi.

The bowl covers meet standard pressure vessel requirements, and necessary connections on the top and bottom cover are pressure-tight to allow continuous high pressure operation. Top cover connections are for feed, effluent discharge and recirculation (if required). Bottom connections are for the nozzle discharge and vent for the nozzle discharge. Clarified effluent is discharged by means of a paring device which functions at a pressure differential up to 50 psi over the operating pressure. Solids discharged from nozzles flow by



DE LAVAL

gravity from the vented sludge port.

The bowl spindle is driven by a direct V-belt drive. The motor and spindle are enclosed in a compact frame for floor mounting. The standard vertical flange motor operates at 1750 rpm and is mounted on an adjustable motor base plate. The motor develops 40-100 hp depending on the material flow through the unit and the pressure requirements. For pressure operation a shaft seal is provided on the bowl spindle directly above the driving mechanism.

The De Laval Separator Co., Industrial Div., Dept. PVP, Poughkeepsie, N. Y.

ORGANIC THICKENERS
For Oil-Based Coatings

Two new organic thickners for oil-based paints, and coatings, have been developed.

Superior Thickener No. 912 is a liquid bodying agent which may be added at any point of the manufacturing process, even after the batch has been completed, so as to increase viscosity.

Superior Organic Thickener No. 9916 is a powder which is added in the mixing stage. It serves to increase viscosity and provides a multi-purpose gel structure which corrects sag, prevents pigment settling, improves brushability and hold-out of paints.

Superior Materials, Inc., Dept. PVP, 120 Liberty St., New York 6, N. Y.

ORGANIC YELLOW
Lead-Free

New Hansa-type organic yellow is offered as a marked improvement over the standard Hansa G pigment. Properties most noticeable are better fade resistance and reduced solvent sensitivity. Color values are slightly better in terms of cleanliness and tint shade. This color is, of course, lead-free and will aid the quality and processing of non-toxic decorative enamels.

Product is especially recommended for alkali-resisting finishes, aerosol enamels, lead-free enamels, color-fast deep yellow coatings, and fume-resistant colors.

Kentucky Color & Chemical Co., Dept. PVP, Louisville, Ky.

PAINT FILLER
Easy to Clean

New paint filler, cap dropper and capper incorporates a special embosser mechanism.

With the embosser feature, the new model becomes the industry's first completely automatic machine which accurately fills, embosses the lids, places the lids on the cans and then seals them in one continuous operation, the manufacturer says.

Features include accurate filling from 1/32 to a full gallon; ease of cleaning and quick changeover time; explosion proof motor and variable speed drive.

Elgin Manufacturing Co., Dept. PVP, 200 Brook St., Elgin, Ill.

PAINT FILLER
Small Batch Packaging

New single-operator Model "R" paint filler and power roller capper is specifically designed for small batch paint packaging.

Low in initial cost and in operating cost, the Model "R" is precision engineered for accurate filling and capping of all paints, enamels and lacquers in sizes ranging from one thirty-second to and including gallons.

Plants with short production runs or quick changeover requirements will find this new machine particularly adaptable. On a continuously moving platform conveyor, cans are automatically centered under the filling nozzle and on completion of the fill are automatically released by a cam controlled stop finger. The operator puts the cover in place and the filled can and cover enter the first of two power driven rollers. The first roller, slightly higher than the second, starts the cover and expels excess air. The second roller drives the cover home without the possibility of bulging cans.

Easy to clean, the machine is equipped with an explosion proof motor, variable speed drive and fine fill adjustment which permits fine adjustment of the fill even while the machine is in motion.

Elgin Manufacturing Co., Dept. PVP, 200 Brook St., Elgin, Ill.

PAINT EMULSION
Pigment Binding Power

Darex Everflex MF, a new microparticle vinyl acetate copolymer emulsion which provides superior performance of vinyl emulsion paints over "green" plaster and exterior masonry, has been introduced.

The new emulsion has a particle size as small as, if not smaller than, any vinyl emulsion marketed today, the company says.

The particle size, together with a unique emulsifying system, provide excellent water resistance, pigment binding power, and film consolidation qualities.

Everflex MF has very high stability in the presence of calcium ion, a cause of color variation sometimes encountered when applying paints over green plaster.

Films cast from Everflex MF have high resistance to efflorescence, crystallized water-borne salts which have leached through the paint film from masonry substrate.

Dewey and Almy Chemical Div., W. R. Grace & Co., Dept. PVP, Cambridge 40, Mass.

PAINT WARMER
No Mixing

New inexpensive, portable electric Shokless "150" Paint Warmer has been announced. This heater may be procured with or without thermostatic control.

Very little solvent needs to be added to heated paint. By greatly reducing the quantity of thinning solvents, the body of the paint is retained providing more uniform coverage, up to six times as great as that obtained with cold paint. Hot paint spreads easily—saves labor.

Mixing is unnecessary. Heated paint circulates, keeping the pigments in suspension at all times.

The Kneisley Electric Co., Dept. PVP, Toledo 3, Ohio.

PHTHALOCYANINE BLUE
Red Shade

New flushed phthalocyanine blue has been developed to meet the needs of the paint industry for (1) a red shade blue, (2) a flocculation resistant blue standard and (3) a flushing in odorless general purpose alkyd varnish.

FL-11-378 has a very bright red shade, somewhat cleaner and slightly redder than the standard flocculation resistant dry color. FL-11-378 is about the same shade as competitive flushed products, but it is considerably cleaner. Because it is so clean, FL-11-378 can be shaded with Yellow Iron Oxide or Phthalocyanine Green to match the manufacturer's desired shade.

Tests show that FL-11-378 is as good or better in flocculation resistance than competitive flushed blues and the best of the non-flocculating dry colors. It is considerably cheaper to use than a dry color when the grinding charge of the dry color is taken into account in the total cost.

FL-11-378 is flushed in a general purpose alkyd varnish containing odorless mineral spirits which is recommended for trade sales enamels. Another flushed standard is also available which has the same composition and physical properties as FL-11-378 except that it is flushed in an alkyd made with regular mineral spirits.

Specific data describing FL-11-378 are as follows:

Composition: Solfast Blue R-NCNF special flocculation resistant pigment. 17%
General Purpose Odorless Alkyd Varnish Dyal XAC-75. . .31%
Odorless Mineral Spirits . . .52%
Weight per gallon: 7.8 lbs.

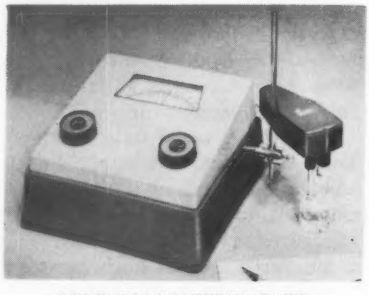
Pigment, Color & Chemical Div., Sherwin-Williams Co., Dept. PVP, 260 Madison Ave., New York 16, N.Y.

PHTHALO GREEN DISPERSION
Low Water Soluble Content

New phthalo green dispersion incorporating unusual blueness, cleanliness, and extra tinting strength is now being offered. Designated W-6012, this green performs with typical phthalo stability, and insures maximum product uniformity because it is manufactured in large size batches.

Product derives its extra margin of tinting strength through the limiting of its particle size to a narrow band in the very fine range. This is accomplished by using a unique manufacturing process which also renders the product completely non-settling. In addition, storage stability is excellent. Other colors are being developed which, through employing this process, will exhibit the same desirable characteristics. W-6012 green has a comparatively low water soluble content—an important consideration in exterior finishes, such as latex house paints, where maximum film durability is vital.

The Harshaw Chemical Co., Dept. PVP, E. 97th St., Cleveland 6, Ohio.



COLEMAN INSTRUMENTS

pH METER
Accepts all pH Electrodes

New pH meter, delivers precision usually found only in high priced pH meters, but is moderately priced. It also offers an extended range, utilizing large, clear, duplex scales covering 0 to 10:0 pH and 4.0 to 14.0 pH. The meter uses Coleman screw base electrodes and also accepts all other modern pH electrodes. This unusually convenient electrode mounting system adapts perfectly to titrations and a wide range of sample volumes.

Meter is housed in a clean, compact, modern case, with high resistance to shock, acids and stains.

Coleman Instruments, Dept. PVP, 42 Madison St., Maywood. Ill.

PIGMENT EXTENDER
Easily Dispersed

New pigment extender offers numerous savings to producers of interior emulsion paints. Called "Micro-Cel T-38," the synthetic, hydrous calcium silicate displays good hiding power at low concentration, according to the firm.

Micro-Cel T-38 can effect savings for manufacturers of emulsion paints in either of two ways. From 30 to 35 pounds of T-38 can replace 40 to 50 pounds of titanium dioxide per 100 gallons with no loss of opacity and only slight differences in tint. In existing formalae, more hiding power can be achieved by using moderate amounts of Micro-Cel T-38 instead of adding titanium dioxide. In this latter case, significantly additional hiding power is obtained at a moderate cost, much less than if titanium dioxide had been used.

Micro-Cel T-38 is an efficient flatting agent, especially useful in reducing angular sheen, even at low pigment volume concentrations. The material is easily dispersed for smooth, low lustre finishes.

Classified as a medium particle size extender pigment, Micro-Cel T-38 give optimum performance when used at levels of 30 to 35 pounds per 100 gallons. It is packed 40 pounds to a multi-walled kraft paper bag.

Johns-Manville Corp., Celite Division, Dept. PVP, 22 E. 40th St., New York 16, N. Y.

PLASTICIZER
Good flexibility retention

Plasticizer-Surfactant, is said to combine both plasticizer and surfactant activities in one product.

As the result of tests made by the firm in its laboratories, the following advantages are claimed by the firm: excellent plasticizing action, extremely low temperature coalescence, very definite improvement in scrubbability, and definite improvement in flexibility and flexibility retention under adverse conditions, such as elevated temperatures.

Two products are available—*P. S. 77* and *P. S. 99*. *P. S. 99* is especially recommended for butadiene-styrene emulsion paints.

Advance Solvents & Chemical, Dept. PVP, 500 Jersey Ave., New Brunswick, N. J.

PLATFORM TRUCK
19,000 lb. Capacity

Special high-capacity, high-lift platform "walkie" truck with capacities up to 19,000 pounds has been designed and is now manufactured by Lewis-Shepard Products, Inc.

LEWIS-SHEPARD

Designed to solve high capacity handling problems in limited maneuvering areas, the powerful 24-volt Jackstacker solves many applications where heavy duty fork lift trucks cannot be used.

Ideal for handling heavy dies from storage to processing areas, this special "walkie" design can be constructed to meet most customer demands in capacity, speed and space requirements.

Lewis-Shepard Products, Inc., Dept. PVP-R10-1, 125 Walnut St., Watertown 72, Mass.

POLYURETHANE VEHICLE
Abrasion-Resistant

New one-can stable polyurethane vehicle, "Spenkel F78," available at 50% in xylol and 50% in mineral spirits, is characterized by the outstanding properties of other polyurethane resins plus a very rapid dry.

Spenkel F78-50X and 50MS films dry tack free with conventional driers in 10 to 30 minutes depending on solvent choice and cure to a Sward harness of 20-25 overnight. Full hardness of 50-60 occurs between two and three weeks; however, the coatings have surprising flexibility.

The new vehicle which has the unique polyurethane toughness, mar and abrasion resistance combined with the fast dry recommends Spenkel F78 as an excellent product for use in floor finishes, traffic paints, aerosol coatings, furniture finishes, prefinished paneling and marine coatings plus specialty uses.

Pigmentation of the product requires no special treatment other than a slightly higher drier level. Spenkel F78 either clear or pigmented is recommended for aerosol finishes. Its fast dry, compatibility with propellants, good can stability and outstanding film properties will produce excellent finished products, the Company says.

Spencer Kellogg and Sons, Inc., Dept. PVP, Buffalo 5, N. Y.

POLYVINYLINDENE CHLORIDE
Laminating Eliminated

New water-system, latex form of polyvinylidene chloride resin is highly stable and will, when used as a coating material, impart a much sought-after combination of outstanding barrier and protective properties.

This new material, called Resyn (R) 3600, (trade name to be announced) can be applied at low cost to a variety of porous and non-porous substrates by standard coating equipment. Need for laminating or extrusion operations is therefore eliminated. Furthermore, all the protective properties of polyvinylidene chloride film are said to be retained in the final coated surface.

Among these properties, the firm stressed the new coating's extreme resistance to transmission of water vapor and common gases such as oxygen, nitrogen and carbon dioxide.

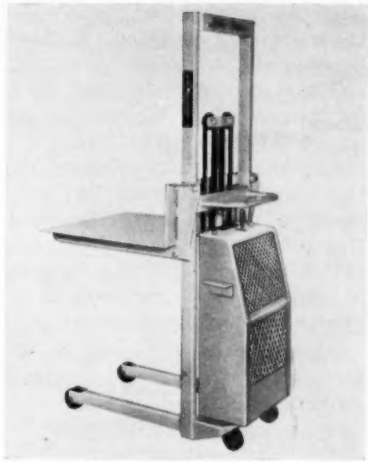
Immediate applications for Resyn 3600 will be in the paper, corrugating and packaging fields. These industries vitally need protective coatings that offer exceptional barrier properties and can be economically combined with low cost materials. Subsequent uses, he said, should develop soon in the textile, agricultural, construction, adhesive, and many other product lines.

National Starch and Chemical Corp., Dept. PVP, 750 Third Ave., New York 17, N. Y.

PORTABLE LIFTER
Light Machine Weight

New low priced compact battery powered portable lifter "Little Dickie" enables an operator to lift, transport and position loads weighing up to 1000 pounds. The platform 26" by 28" travels from 4½" above the floor to 64" at 20 Fpm.

Lifting power is supplied by a unitized battery hydraulic unit with a built-in overnight charger.



LANGLEY

Double lifting chains and special rollers to handle side thrust platform loads provides safety. It has great mobility because of a combination of anti-friction bearing wheels, light machine weight and compactness.

The model BHD "Little Dickie" complete with battery and charger weighs only 330 pounds and will pass through a 78" door.

Langley Manufacturing Co. Inc., Dept. PVP, 913 Cambridge St. Cambridge 41, Mass.

POWDERED MILDEWCIDE
In Water Soluble Package

Powdered mildewcide and preservative for paints is now available in premeasured water soluble packaging especially designed for aqueous systems.

The new packages are available in 4 oz., 8 oz. and 16 oz. sizes. The packages can be added directly without opening. The packaging material quickly dissolves in water, allowing the mildewcide to disperse freely. Since the powder need not be handled directly, weighed or measured, and since employees are not in direct contact with the powder, the packaging offers greater safety, economy and accuracy in use.

Product is a specially prepared pheynlmercuric prepionate which can be used in both oleoresinous and aqueous systems.

Metalsalts Corp., Dept. PVP, 200 Wagaraw Rd., Hawthorne, N. J.

PRECIPITATED SILICAS
Low Acidity

Commercial manufacture of

micro fine precipitated silicas under the trade name of "Quso," has been announced.

The silica used as flatting agent for nitrocellulose lacquers is designed as "Quso F 20." It is a soft micro fine product with an ultimate particle size from 9-15 millimicrons. This micro fine precipitated silica is slightly acid (pH 6.4). Low acidity is valuable in preventing degradation of ingredients of a lacquer.

According to the company, the features of Quso F 20 are high flatting efficiency, excellent suspension characteristics, good resistance to overgrinding. When Quso F 20 is used in nitrocellulose lacquers at any gloss level, the films are smooth and transparent with a warm "rubber effect" appearance combined with a sleek feel.

A similar product, Quso G 30, because of its alkaline nature (pH 8.2) is applicable in other types of finishes.

These products are available in multiwall moisture resistant paper bags of 25 lbs. net. Prices range from 55 cents per pound for minimum lots of 10,000 lbs., to 70 cents per pound for lots of 200-575 lbs.

Philadelphia Quartz Co., Dept. PVP, Public Ledger Building, Independence Square, Philadelphia 6, Pa.

PUMP

Water Cooling Jackets

New sealless "canned" pump with an externally mounted heat exchanger for high temperature operation has been announced.

In addition to the heat exchanger, the new high temperature models are equipped with water cooling jackets around the motor section for maximum cooling. All advantages of "canned" construction are retained. Pump and motor are one unit, and a portion of the pumped fluid circulates through the motor section between the rotor and stator both of which are "canned" in corrosion-proof, non-magnetic liners. In the new high temperature models, the pumped fluid is circulated continuously through the heat exchanger and the motor section, the pumped fluid acting as motor coolant and bearing lubricant. Since pump and motor are one unit, there are no stuffing boxes or seals and leakage is completely eliminated. This is especially advantageous when handling corrosive, toxic, inflammable, explosive, radioactive, or expensive liquids.

Chempump Div., Fostoria Corp., Dept. PVP-60, Huntingdon Valley, Pa.

PUMP MOTORS

Rigid Frames

New close coupled pump motors in new frame sizes, from ½ HP at 900 RPM through 75 HP at 1800 RPM—frames 182 through 405 U have been announced. Explosion proof and totally enclosed fan-cooled from ½ HP, 900 RPM through 30 HP, the newly designed frames are rigid, seasoned, cast iron with integrally cast feet. The cast iron endbells have precision machined registers and bearing fits. Deep-drawn baffle plates in the endbells provide extra protection for the winding. Connection boxes can be rotated to make connecting easier.

The die cast aluminum rotors are equipped with dual cooling fans and the entire rotor assembly is dynamically balanced. Prelubricated sealed ball bearings require no cleaning; the correct quantity of lubricant is sealed in, dirt and moisture are sealed out.

Stator windings are impregnated with moisture-resisting, thermosetting insulating varnish, and are tested in accordance with NEMA specifications. Uniformity of the air gap between rotor and stator is accurately maintained for peak performance.

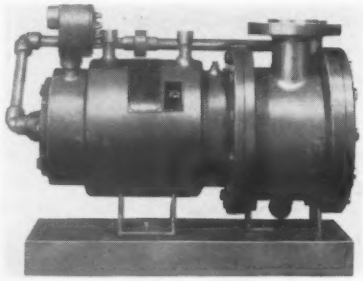
The Lima Electric Motor Co. Inc., Dept. PVP-314-1, Lima, Ohio.

PUMPS

Leakproof Pumping

A new series of two-stage, high-head "canned" pumps has just been introduced. The new product line, known as Series D, is designed for leakproof pumping at heads up to 600 feet. All of the advantages of canned pumps are retained. Rotor, shaft and impellers form a single rotating assembly. Both rotor and stator are completely enclosed or "canned" within corrosion-resistant, non-magnetic alloy cylinders. The pumped fluid is allowed to circulate through the motor section and serves to cool the motor and lubricate the bearings. No external lubrication is ever required. Since pump and motor are built as a single unit, there are no troublesome stuffing boxes or mechanical seals. Leakage is completely eliminated. Thus, operating costs are greatly reduced. Low temperature Series D pumps for operation under 400°F. are equipped with water jackets around the stator for cooling if required. High temperature models for the handling of fluids over 400°F. are equipped with external heat exchangers. Series D pumps are available for temperatures up to 850°F. and system pressures up to 3500 psi. The new pumps can be modified for vacuum or slurry service.

Chempump Div., Dept. PVP, Fostoria Corp., P.O. Box 35-1, Huntingdon Valley, Pa.



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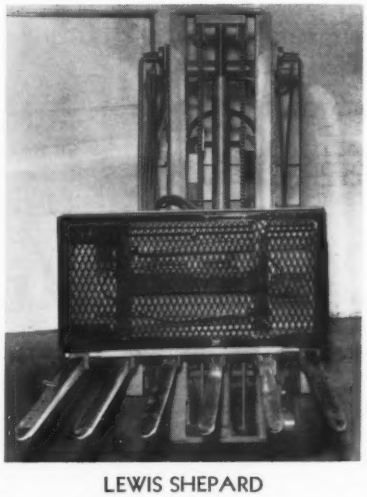


LEWIS SHEPARD

PUSH-OFF DEVICE

Handles Loads in Process

A push-off device with side shifter and multiple forks has been developed for establishments using a take-it or leave-it pallet system.

This is the system whereby unit loads are handled in process and placed in storage on pallets but are shipped without pallets. The multi-purpose equipment is capable of

handling the palletized unit loads in process and storage and also the non-palletized loads during shipment. During process and in storage the palletized loads are handled in the conventional manner. When loading carriers, the multiple tined forks are slid between the small stringers on the top of the pallet and the load is raised off. The load is then moved to the carrier and pushed off the forks.

Lewis-Shepard Products, Inc., Department PVP-R10-29, 125 Walnut St., Watertown 72, Mass.

HOUSTON

PYCNOMETER
Two Cylinders

New air comparison pychometer employs only two cylinders and is both smaller and lighter than the first prototype.

A thorough search of issued patents and trade literature indicates that the comparison principle employed, which derives from the kinetic theory of gases, has never been used before.

The air comparison pycnometer will not only shorten accurate density determinations from hours to one minute, but should open up new areas of application for density measurements for quality control, and porosity determination, etc.

Houston Instrument Corp., Dept. PVP, P.O. Box 22234, Houston 27, Tex.

RESIN
Low-Cost Formulations

New resin makes lower cost multicolor paint formulations possible, according to the manufacturer. The new multi-color formulation reportedly sprays easily, wears well, and has good adhesion, especially when used over a concrete substratum. Individual pigment particles retain color identity both in storage and upon application, the firm said.

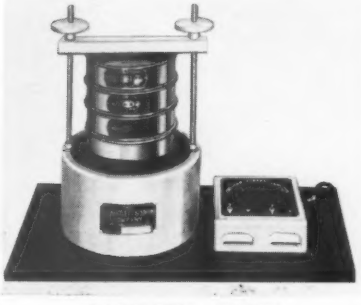
According to the company, X-37 Resin, replacing the more expensive Vinyl Toluene-Butadiene Copolymer Resin in a base formulation, cuts vehicle raw material costs yet maintains satisfactory performance.

Velsicol Chemical Corp., Dept. PVP, 330 E. Grand Ave., Chicago 11, Ill.

SCREENING UNIT
Quiet Operation

New CDP 8-in. circular screening unit, designed for research laboratory, production-control labs, and pilot-plant use, features unusually quiet operation. In addition, it is readily carried by one man, weighing only about half as much as comparable competitive units.

The CDP screening unit features a unqiue vertical-horizontal pulsating action that assures fast, fine screening. The pulsating action is provided by two independently driven rotating shafts operated at adjustable speed differentials. Each



BARTLETT & SNOW

motor is rheostat controlled so the pulsating action can be readily adjusted for different materials. The Wettlaufer-developed pulsating action screens most materials almost instantaneously and keeps the screen cloths clean.

When used with standard sieves and pans without spouts, the CDP 8-in. screening unit provides rapid analysis of measured batch samples. When equipped with sieves fitted with spouts, the unit is useful in production control for analysis of larger samples by continuous operation—or for continuous screening and recovery of valuable materials.

This unit is ideally suited for screening granular, crystalline, powdery, or other dry materials, even through 200, 325, and 400 mesh. In addition, it gives excellent results screening slurries and fluids, such as paint, syrup, etc. Even when operated continuously, there is no blinding (clogging of the screens).

There is no vibration in the base, so the unit can be set on any table or bench. Motor operates on DC or 25, 50, or 60-cycle AC current. The unit is also available in 12 and 18-in. sizes.

The C. O. Bartlett & Snow Co., Dept. PVP, 6200 Harvard Ave., Cleveland 5, Ohio.

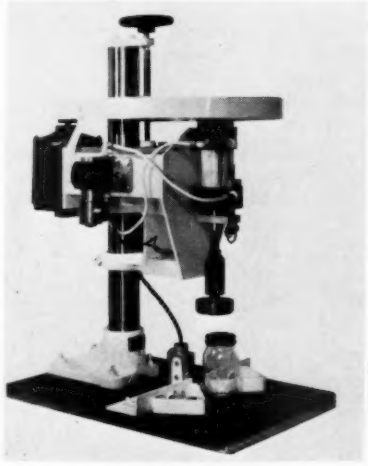
SCREW CAPPER
Electronically Controlled

A completely new type of air operated screw capper, Model "CEC" for all sizes and types of caps and containers, even soft polyethylene bottles, has been announced.

Automatic electronic controls govern the entire capping cycle. This eliminates an average of about 1500 to 3000 hourly motions per operator. Aside from increased output there is also a consequent-reduction in operator fatigue.

The "Whirlwind" is equipped with a special control valve which cushions the descent of the capping head thus preventing damage or breakage in event container is incorrectly positioned. This "cushioned" capping head is ideal where plastic or fragile containers are being handled.

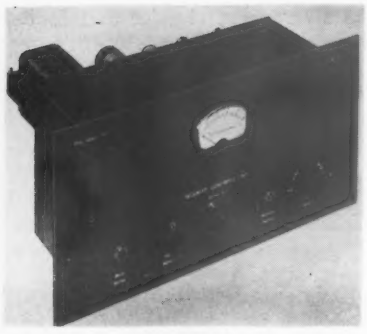
Scientific Filter Co., Dept. PVP, 57 Rose St., New York 38, N. Y.



SCIENTIFIC FILTER

SENSING CONTROL
Chassis or Key-locked

Extensively redesigned and broadened in its applications, the



SECURITY

new sensing control recognizes metallic and nonmetallic objects, without physical contact, as they enter a capacity field.

Designated as Model 400, it is recommended where switches are impracticable. Consisting of a sensing element or probe (of any form or size) connected by coaxial cable to the electronic control, the device can be set up to any given constant at a given time interval. The control is now available in chassis form for panel mounting (illustrated) or in a key-locked, shock-mounted and gasketed cabinet.

Not only does the unit recognize errors or deviations from the constant, as objects enter the field, but it indicates whether the sensed objects are too large or too small too far or too near to a predetermined position or setting. Detection is expressed in numerous ways, such as stopping a machine, actuating a rejecting or correcting device (via plus-minus relays) or signaling for action by an attendant, states the manufacturer.

Some example of its uses are: detecting variations in flow of material in chute; revealing changes in moisture content of grain, flour, feed, cereal, gypsum, etc.; indicating changes in liquids flowing through pipeline (i.e. gasoline vs. kerosene); testing for presence of foreign substances in fluids; discovering undesirable areas in continuous strip material (i.e. ready-made adhesive bandages, gauge products, textiles, sanding belts; signaling improper nesting of blank in press die; revealing broken bits on automatic drilling and tapping machines; counting products in closed cartons; sensing missing caps on filled bottles prior to packaging; controlling position of cans on conveyor prior to filling operations; checking suitability of diesel engine fuel oil to determine necessity of changing; sizing and measuring parts and products on conveyor; actuating solenoids, correcting or rejecting mechanisms, counters, audible or visual signals.

Security Controls, Inc., Dept. PVP, 503 Franklin St., Buffalo 2, N. Y.

SILICA PIGMENT
Reduced Reagglomeration

"Zeolex 80," a unique pigment to effectively disperse titanium dioxide in latex and emulsion paints, is now available.

The new synthetic silica pigment is said to promote better utilization of pure titanium dioxide and thus produces higher optical properties than are attained with other extender pigments. Because it combines just the right properties to coat or condition the titanium dioxide, it reduces reagglomeration and provides greater hiding power.

Cost savings over present formulations are attained since Zeolex 80 is about half the price of titanium dioxide and half its density. There is no sacrifice in film quality.

J. M. Huber Corp., Dept. PVP, 630 Third Ave., New York 17, N. Y.

SILICONE FLUIDS
Soluble in low alcohols

Two new silicone fluids are said to exhibit unusual compatability with a diversity of materials.

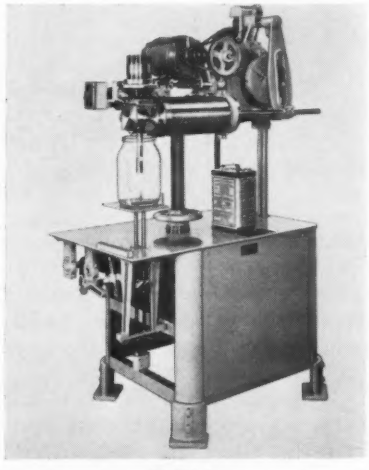
Identified as XF-1030 and XF-1031, both fluids offer a combination of properties not available in any other silicone, the manufacturer says. Like conventional silicone fluids, they are soluble in aromatic and chlorinated hydrocarbons. However, due to their unique composition, XF-1030 and-1031 are also soluble in many alipathic hydrocarbons and lower alcohols, including ethanol.

Another unique feature of these fluids claimed by the company is their ability to self-emulsify in water. Both XF-1030 and-1031 instantly disperse in water with a minimum of stirring, forming a relatively stable emulsion.

These fluids have release and slip properties typical of all silicones. Properties shared by both include a specific gravity of 1.02-1.03 at 25°C. and a pour point of approximately –60°C.

Due to the many unusual features of these silicone fluids, the firm expects them to meet a variety of application requirements throughout industry. Among the suggested uses are release applications where removal of silicone by an alcohol or water wash is desirable; as a paint additive to eliminate pigment flotation and cratering; and in the manufacture of cosmetics where it is desirable to combine the protection of silicone with a fluid having alcohol solubility.

Silicone Products Dept., General Electric Co., Dept. PVP, Waterford, New York.



ELGIN

SINGLE VALVE FILLER
Accommodates Glass and "F" Tins

New machine is designed to accommodate all glass and "F" tins up to 1 gallon and give faultless delivery of products in the food, paint, cosmetic and oil fields.

According to the firm, the new precision engineered model uses a special three-inch pipe feed, one gallon cylinder and piston with a fine fill attachment on an automatic lift table.

Low in initial cost and easily serviced, the new bottom-fill filler takes only minimum floor space—24 x 35 inches.

Elgin Manufacturing Co., Dept. PVP, 200 Brook St., Elgin, Ill.

SODIUM BORATE
Powdered Form

FR 28 is a Sodium Borate product in a readily soluble powdered form, containing approximately

65% B_2O_3. FR 28 is of uniform composition prepared by a special process and, therefore, is said to have superior properties to any mechanical mixture of Borates which would give a similar chemical composition.

This product has been specifically developed for use as an additive to latex base paint compositions to produce flame retardant coatings.

Hydrogen Ion Concentration—aqueous solutions of FR 28 range from mildly alkaline at low concentrations to near neutral as concentration increases at ordinary temperatures.

U. S. Borax, Dept. PVP, 630 Shatto Place, Los Angeles 5, Calif.

M-H STANDARD

STORAGE RACK
Increased Picking Speed

Latest improvement in high speed order picking is available through the use of a new live storage rack. Two major benefits are: "One Hand Picking"—finger tip pressure under the carton releases it for rapid one hand removal and effortless withdrawal of carton being picked.

These features are made possible by a redesign of the frame and the addition of ball bearing wheel stops at the order picking front. These new wheel stops are now a standard feature of all Versaracks at no additional cost. They allow free access to the underside of the carton for quick picking and permit easy release of the carton even when rack is 50′ in depth. The automatic ejection results in increased picking speed. This is particularly true when the rack is equipped with a conveyor along its face to take away picked merchandise. The picker then merely allows the carton to drop gently on the conveyor with upward resistance of his picking hand.

Past installations have shown that a properly designed rack can cut order picking costs by as much as 80%. Additional benefits are up to 50% reduction in floor space, better housekeeping, protection of merchandise, first in first out inventory to eliminate spoilage and easier inventory control.

M-H Standard Corp., Dept. PVP, 517 Communipaw Ave., Jersey City 4, N. J.

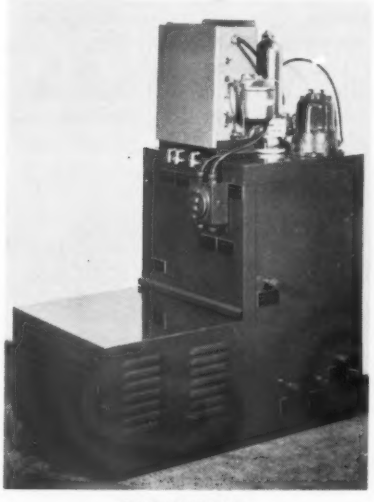
STORAGE TANKS
500 Gallon Capacity

New polyethylene storage tanks in the 500 gallon capacity range, are said to retain all of the inherent characteristics of polyethylene with particular emphasis being placed on permanent corrosion resistance. Several styles are available—full open head, closed head with openings, flat or conical bottoms.

Access and drain fittings are available in wide choice.

Extensive field testing and on location experience shows no outer support is needed. Tanks are made in virgin natural polyethylene or black for outdoor storage.

Delaware Barrel and Drum Co., Dept. PVP, Wilmington, Del.



BROOKFIELD

STREAM ANALYZER
Safety Purging System

New stream analyzer is an integrated viscosity controlling package permitting the removal of fluid from a pressurized line, measurement of its viscosity, and its return to the line. When used with the company's viscometran, viscosity measurements can be made on any flowing stream within wide pressure and temperature limits.

Equipped with two gear pumps driven by a single explosion-proof motor, the stream analyzer will produce a steady flow of 1 gpm through a sampling chamber in which the viscosity measurement is made. The total volume of the chamber is 0.3 gallons to insure the system's quick response. The system will handle material up to 550°F, with provision for accurately measuring temperature of the flowing stream. After measurement the material is returned to the line from which it was taken, the maximum line pressure being 150 psi.

Brookfield Engineering Laboratories, Inc., Dept. PVP, 15 Cushing St., Stoughton, Mass.

SURFACE COATING RESIN
Formulation Latitude

A new surface coating resin of extraordinary versatility has been developed. The company's plastics and resins division is now making available commercially CYZAC 1016, a new product formulated for use with alkyds to provide exceptional impact resistance, hardness and mar-resistance to baked enamels while permitting them to retain a high degree of flexibility.

Besides this unusual combination of features, CYZAC 1016 is also 1½ times more effective than melamine resins in alkyd/amino systems. This permits paint manufacturers greater latitude in formulation, hence more economical use of materials since one pound of CYZAC 1016 can replace 1½ pounds of melamine resin. The low viscosity of CYZAC 1016 has little effect on the final viscosity of the finished enamel.

The product is currently manufactured at Bridgeville, Pennsylvania. The unit of sale is tank car and tank truck, carload or truckload in drums, as well as less-than-carload drums and five gallon pails.

American Cyanamid Co., Plastics and Resins Div., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.

SURFACE COATING RESIN
Mar-Resistant

New surface coating resin of ex-

traordinary versatility has been developed. The company is now making available commercially CYZAC 1016, a new product formulated for use with alkyds to provide exceptional impact resistance, hardness and mar-resistance to baked enamels while permitting them to retain a high degree of flexibility.

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American Cyanamid Co., Plastics and Resins Div., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.

SYNTHETIC PEARL ESSENCE
Twin Inherent Colors

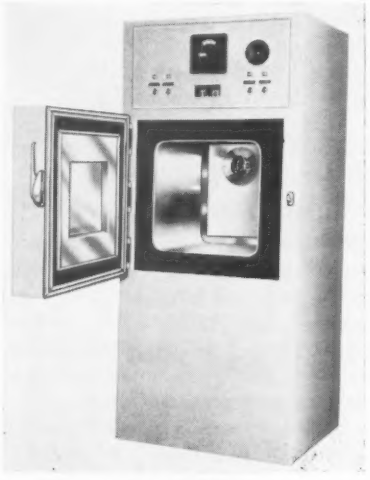
New synthetic pearl essence provides color along with pearly lustre. Available in formulations for surface coating and for incorporation into plastics, the colors provide multiple color effects which cannot be achieved with conventional colorants.

While the colors react like conventional pearl pigments in all respects, they have twin inherent colors: one observed by reflected light, and the second seen by transmitted light. For example, a polyester cast sheet containing the red pigment appears red when held against a dark background and examined by reflected light, and appears green when viewed by transmitted light.

Colors such as gold, red blue, green, and orange are now available. These colors are produced by optical effect rather than by the absorption of a particular band of wave lengths as occurs with ordinary dyes and pigments. Multicolor effects may be obtained by using several colors in combination. The colors are rather subtle, and of moderate intensity, but the two-color play inherent in each pigment makes possible effects which cannot be otherwise achieved, and which verge toward iridescence.

Colors are available in formulations for use with most coating vehicles and for most plastics.

Mearl Corp., Dept. PVP, 41 E. 42nd St., New York 17, N. Y.



LABLINE

TEST CABINET
All Steel Finish

New environmental test cabinet with special "add-on" facilities for altitude, vacuum, humidity and temperature testing has been developed.

The universal unit was designed specifically to answer the needs of laboratories with expanding environmental test requirements.

The "Com-pac Cab," as it is called, was designed specifically for effective low temperature operation with an adjustable temperature range from 300°F. to −120°F. It functions with complete dependability for varied testing by merely adding optional equipment. The working chamber is 19″ x 19″ x 19″. It is electrically welded and resistant to high pressures.

Construction features include a sturdy, galvanealed, all-steel finish. It also has a frostproof, multipane door in front for easy access to the chamber area, which is illuminated by a 40-watt Lumiline fluorescent lamp.

The unit has a sealed-in oil supply and a built-in thermal overload protector. Overall dimensions are 74″ x 32″ x 32″, which allows easy, compact installation. It is electrically powered by a 230 volt, 60 cycle, single phase motor. It may be ordered as a horizontal or vertical free-standing floor unit or for bench use.

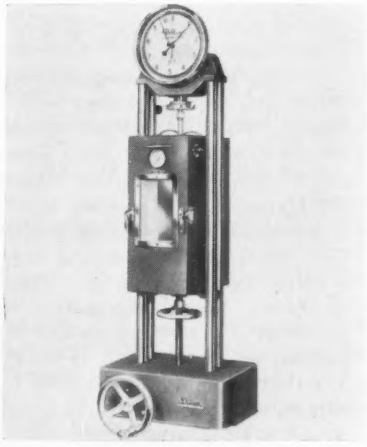
Hudson Bay Co., Division of Labline, Inc., Dept. PVP, 3070-82 W. Grand Ave., Chicago 22, Ill.

TESTING CABINET
Increased Sidewall Thickness

A useful accessory for a well-known line of universal testing machines has been announced. The controlled-temperature cabinet has undergone several important changes that make it more adaptable to a variety of operating conditions.

To provide a more uniform temperature, sidewall thickness has been increased, and a positive interlock is now employed at all seams or joints. Electric heating element surface has been increased so that there is less waiting time for temperature level. The new improved thermostat regulates heat to close degree. The new larger size observation window gives the operator a clear view of the specimen under test.

The Model L tester has a 20″ daylight opening. Controlled temperature cabinets will also fit 30″ and 40″ daylight opening models. Specimens are inserted in grips inside of cabinet in normal manner and can be checked in tensile, compression, transverse or shear. The Model L instrument will apply test loads from as low as 0-250 pounds, and as high as 0-10,000 pounds. It is available either as a hand-operated or motorized unit. Dynamometer gauges are offered with 5″ or 10″ diameter dials and are readily interchangeable as to capacity. Installation of the con-



W. C. DILLON

trolled temperature cabinet requires approximately four or five minutes, thus making it a simple matter to check materials at elevated temperatures. Working range is from room temperature up to 400°F. on standard cabinet.

George A. Dillon, c/o W. C. Dillon & Co., Inc., Dept. PVP, 14620 Keswick St., Van Nuys, Calif.

TETRACARBOXYBUTANE
Highly Reactive

New acid, 1,2,3,4 Tetracarboxybutane (T.C.B.) has a melting point of 187-191°C. It is soluble in water and most polar solvents and is insoluble in hydrocarbons.

T.C.B. is a highly reactive acid which is useful for the preparation of esters having potential applications as plasticizers and high temperature lubricants. The amide derivatives may also have possibilities as lubricants. The potential applications of T.C.B. in the coating industry include preparation of alkyd resins, polyesters which may be employed in resin manufacture and in polyurethane formulations.

The acid or its anhydride will be important possibly as an epoxy curing agent.

T.C.B. is also a versatile intermediate an can probably be employed in the pharmaceutical, agricultural and textile industries. The presence of four (4) carboxyl groups permit the use of T.C.B. in the beverage industries where large quantities of carbon dioxide are required. These functional groups also indicate potential use as a sequestrant. The four carboxyl groups possess probably the same reactivity with various chemical reagents. It is therefore a material with possibilities that will depend on the imagination of the chemist.

Abco Chemical Co., Dept. PVP, 68 Fleet St., Jersey City 6, N. J.

THERMOMETER
Hand Calibrated

Accurate measuring of temperatures in deep vats, kettles, tanks, stacks, ovens, ducts, and other such vessels, is reportedly possible with new giant stem stainless steel thermometer. All units are ruggedly engineered to withstand pressures up to 3476 psi and can be used for both liquids and gases. It is calibrated for accuracies within 1% of the full scale reading.

Six ft. stem thermometers are available in temperature ranges from 0-200°F. to 200-1000°F. and is also supplied in centigrade calibrations. Large 5″ dial makes reading easy. Other dial sizes are 1-5/32″, 1-11/16″, 2-5/16″ and 3″.

W. C. Dillon & Co., Inc., Dept. PVP, 14620 Keswick St., Van Nuys, Calif.

THICKENER
Free Flowing

New thickener, Modicol VI, is used for natural and synthetic latices used in coating and adhesive applications. It is a modified ammonium polyacrylate and, is said to offer the user the following advantages: Excellent color and clarity, high viscosities at low concentrates, Free flowing, and does not yellow or embrittle.

When used in latex paint it thickens the formula, aids in pigment suspension and contributes to better brushability. In latex adhesive preparations and dip coating applications it thickens the formula and yields a smooth homogeneous product having good film-foaming characteristics. Storage stability of the adhesive is improved and the danger of cooagulation under mechanical stress is minimized.

Protective Coatings Dept., Nopco Chemical Co., Dept. PVP. 60 Park Place, Newark, N. J.

THICKNESS TESTER
Gages Coatings on Iron

New instrument has just been introduced for gaging the thicknesses of coatings on iron and steel. Identified as the "ES Permascope," the device provides a non-destructive means of measuring thicknesses of organic and non-magnetic metal coatings (including phosphate) with the accuracy of the microscopic method. It is reported to be ideally suited for testing coating thicknesses on piston rings, thin wire, screws, nuts, pipes and cylindrical containers, as well as for gaging the thickness of foil or sheets made of non-ferrous materials.

TWIN CITY

At least two scales of measurement are provided with the second scale starting where the first scale ends. For example: Model ES le 2 J4a has two scales with ranges of 0-0.001″ and 0.0008″-0.0010″. Model ES le 3 J4a has three scales with ranges of 0-0.001″, 0.0008″-0.010″ and 0.008″-0.100″.

Hardened beryllium copper foils in accurately-determined thicknesses are furnished for calibrating the instrument. Control dials permit quick recalibration for a given test specimen without the use of foils.

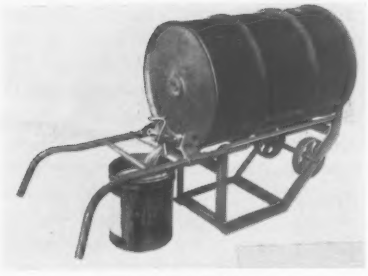
Four probes are available with distances between poles of 5/32″, ½″, 5/8″, and 1″ for measuring thicknesses up to ¾″. A special attachment can be furnished for applying the probe at constant pressure to soft materials as well as to small diameter wire. Other accessories include a holding fixture for measuring plating thicknesses on piston rings and an attachment for gaging coatings on the inner walls of tubing, pipe and cylinders (with min. I.D. of 11/16″) at any point within the bore, regardless of depth.

Twin City Testing Corp., Dept. PVP, 533 South Niagara St., Tonawanda, N. Y.

TRUCK and DRAIN RACK
Loads Automatically

A standard combination truck and drain rack that is designed for users of solvents, cutting oils and detergents, is announced.

It can be easily moved through crowded, narrow aisles and around heavy machinery. To load just tilt truck against drum, sliding steel fingers down to engage top rim of drum; then rock truck back to wheeling position, and loading is automatic. Slight downward push on truck handles raises wheels



PALMER-SHILE

and lays rack on floor, thus providing convenient drain of drum. Equipped with detachable handles that may be removed to conserve floor space—one pair will serve any number of trucks. All welded construction of heavy angle iron frame with sturdy steel tubing for handles. Two eight-inch roller bearing wheels. Weight approximately 90 lbs.

Palmer-Shile Co., Dept. PVP, 12622 Mansfield, Detroit 27, Mich.

ULTRAVIOLET ABSORBERS
No Acetic Groups

Two new ultraviolet absorbers, Uvinul N-35 and Uvinul N-38, are the first of a new family of UV absorbers which are chemically identified as substituted acrylonitriles. Unlike other available UV absorbers, they do not contain acidic aromatic hydroxyl groups and show excellent UV absorption properties under varying pH conditions. The absence of these acidic groups suggests uses of these new compounds in systems which would be adversely affected by their presence.

Uvinul N-35 and N-38 are particularly suitable for protecting nitrocellulose lacquers against UV degration, without adding undesirable color to the coating. They may also be of value in other systems such as butadiene-styrene latex, melamine-formaldehyde, urea-formaldehyde, epoxy-amine and nylon formulations.

Suggested applications include a variety of industrial and consumer product uses, including plastics, lacquers and paints, textiles, adhesives, packaging materials and paper-coatings.

Dyestuff and Chemical Div., General Aniline & Film Corp., Dept. PVP, 435 Hudson St., New York 14, N. Y.

ULTRAVIOLET ABSORBERS
Variety of Applications

Two new ultraviolet absorbers, *Uvinul N-35* and *Uvinul N-38*, are announced.

The two products are the first of a new family of UV absorbers which are chemically identified as substituted acrylonitriles. Unlike other available UN absorbers, they do not contain acidic aromatic hydroxyl groups and show excellent UV absorption properties under varying pH conditions. The absence of these acidic groups suggests uses of these new compounds in systems which would be adversely affected by their presence.

Uvinul N-35 and *N-38* are particularly suitable for protecting nitrocellulose lacquers against UV degradation, without adding undesirable color to the coating. They may also be of value in other systems such as butadiene-styrene latex, melamine-formaldehyde, urea-formaldehyde, epoxy-amine and nylon formulations.

Suggested applications include a variety of industrial and consumer product uses, including plastics, lacquers and paints, textiles, adhesives, packaging materials and paper-coatings.

Dyestuff and Chemical Div., General Aniline & Film Corp., Dept. PVP, 435 Hudson St., New York 14, N. Y.

UNCUT RESINS
Pale Straw Color

Uncut resins, direct from the cooking vat, that are particularly well suited for metalizing, have been announced.

These uncut resins permit adjustment of solids content and viscosity by the user to meet specific needs. They are suitable for thinning with low-cost, readily available materials with flash points above 100°F.

Adjustment of solids content and viscosity, by the user, permits the application of a high solids mix for uniform, high gloss on porous and rough die castings, or a very thin coating on smooth metal surfaces for the same type of finish. Recommended thinners include super high-flash naphtha, Solvesso #100, or slower drying Solvesso #150.

Standard baking schedule ranges from 20 to 60 minutes at temperatures ranging from 250 to 350 degrees F. In the use of infra-red heating with automatic conveyors the curing time may be speeded up to two minutes.

Application of base and top coats may be made with the improved method of flow-coating, followed by short air-drying on a revolving rack; or by automatic spraying methods.

The "MC baking type lacquer resin" has an extremely pale straw color which is suitable for use on silver nitrate coatings and for protection of polished brass, aluminum and zinc die-castings. It is sold by the pound in standard five-gallon pails and 55-gallon steel drums.

Schwartz Chemical Co., Dept. PVP, 50-01 Second St., Long Island City, N. Y.

URETHANE COATINGS
High Adhesion

New, balanced series of clear urethane coatings has been developed. Twelve different coatings, each with its particular characteristics, are included in the complete series. The twelve numbers provide a range of coating characteristics that cover practically every need, performance characteristic, and application technique, according to the company.

Recommended as replacements for clear varnishes and lacquers and as special purpose coatings, the balanced series of coatings is formulated from four basic iscocyanate resins. They provide tough, highly water-resistant finishes, plus high adhesion to many materials both rigid and flexible.

The coatings are being used for protective surfacing in both maintenance and the manufacture of new products. Typical maintenance uses include treatment of surfaces subjected to hard use such as floors and wall surfaces and surfaces much exposed to severe chemical or natural atmospheres. For new products, uses include coatings for industrial equipment, such as shuttles and filter plates, and as durable finishes for objects that receive much wear or exposure.

B. B. Chemical Co., Dept. PVP, Cambridge, Mass.

VINYL DISPERSION RESIN
Low Viscosity

The development and availability of PVC 70, a new vinyl dispersion resin for organosols and plastisols has been announced.

Considered one of the most thoroughly pretested dispersion resins ever put on the market, PVC 70 is said to allow the formulation of dispersion compounds with several distinct advantages over conventional compounds: low viscosity at both low and high shear rates as well as excellent viscosity stability.

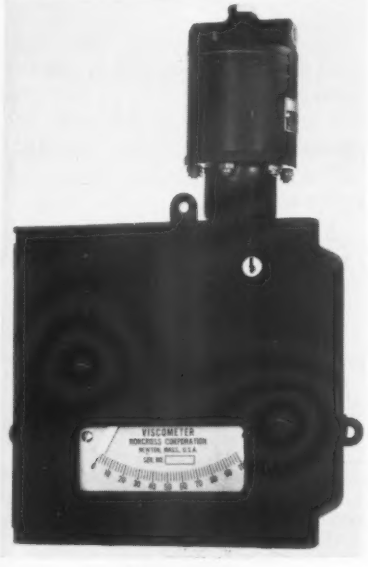
According to the manufacturer, over a million pounds of PVC 70 were produced at the firm's new facilities in Houston, Tex., to test and prove its superior uniformity in quality and performance. PVC 70 is now being used extensively by plastic processors in production runs throughout the country.

Diamond Alkali Co., Plastics Div., Dept. PVP, 300 Union Commerce Bldg., Cleveland 14, Ohio.

VISCOMETER
High Sensitivity

New viscometer model IP is used with any measuring elements that have been designed to measure in open tanks, pressure or vacuum vessels, or in pipe lines.

The IP model receives an electrical signal from a measuring element and provides a 3 to 15 p.s.i. output in addition to indicating viscosity.

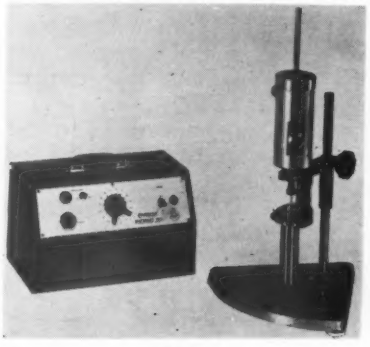


NORCROSS

This air signal permits the use of all types of pneumatic control and makes it possible to use the firm's viscometers with any manufacturer's pneumatic receivers and controllers. Also by suitable transducers or converters various electric receivers can be used with the viscometers.

Measuring elements all use the proven falling piston principle which inherently provides high sensitivity and repeatability with a simple rugged instrument necessary for viscosity process control. A piston is periodically raised within a cylinder and the time required for it to fall a fixed distance by gravity is a measure of viscosity.

Norcross Corp., Dept. #N47-PVP, Newton, 58, Mass.



FECKER

VISCOMETER
15 Readings

New 15-speed viscometer for laboratory and in-line process use has been developed. This unit is capable of 15 readings that can be used to produce very accurate rheograms and automatically control manufacturing processes, when flow characteristics are a function of product quality. The viscometer speed varies from 5.6 R.P.M. to 352 R.P.M. with shear rates from 1 to 2000 seconds and shearing force from 2 to 200,000 dynes per square cm. It measures viscosity of liquids, pastes and many plastic materials in the range from 0.2 cp. to 10,000,000 cps. The electrical requirements are 110 volts, 60 cycle AC.

J. W. Fecker, Division of American Optical Co., Dept. PVP, 6592 Hamilton Ave., Pittsburgh 6, Pa.

WATER DISPERSED DRIERS
Pre-dispersed

Driers are designed specifically for use in all latex and pigment dispersion systems. These ready-to-use products contain finely divided metal naphthenates in water, are pre-dispersed so that only simple mixing is required for thorough incorporation with the finished paint at any stage of manufacture. Previously available latex driers have been dispersible, but not *pre-dispersed*. The size of the emulsified drier particles is the same as the size of the particles of latex, and remain in suspension.

Meletex driers are available in the following metals: Cobalt 5%, Lead 20%, and Manganese 5%. U. S. patents are pending.

Harshaw Chemical Co., Dept. PVP, 1945 E. 97th St., Cleveland 6, Ohio.

WATER-SOLUBLE POLYMERS
Nonionic, Anionoic, Cationic

A new family of water-soluble polymers, useful as adhesives, thickeners, protective colloids, and suspending agents, is available.

Called "Ceron," the new chemical is available as a nonionic material, a product which is anionic in nature, and a product which is cationic. In addition, Ceron N, nonionic, is available in three different types.

Chemically, the new water-soluble polymers are polymeric carbohydrates etherified to give the water solubility, physical and mechanical properties, and other characteristics desired. Because of their special chemical compositions, and the manufacturing processes used, they offer certain advantages.

In solution properties, the Ceron polymers have certain characteristics similar to starches. However, they are soluble without cooking and do not retrograde. Solutions, even of the very low viscosity types, can be prepared without color degradation; and viscosities are stable with no increase on aging. In addition, other differences become apparent on study.

Ceron N types are nonionic and have wide utility as thickeners, sizings, and emulsion stabilizers. Their adhesive and film-forming properties make them equally useful for tape, label, and envelope adhesives. Ceron N-4S can be used as a water-soluble thermoplastic to produce films which not only have quick tack and a wide range of

adhesion, but which can be heat-sealed as well.

Ceron N-4E, a very low viscosity, low-molecular-weight type is outstanding for its color and color stability, high solids solution, stable viscosity, and film quality. All Ceron N grades can be readily insolubilized with suitable reagents. This property can be of particular interest in strippable coatings, textile finishes and coatings, and binders.

Ceron AN is anionic, providing a net negative charge when in solution. This grade has aroused special interest as a suspending agent and thickener in emulsion polymerization reactions. Ceron CN, on the other hand, contributes a net positive character to its solutions, since its substituent groups are polar in nature. It is utilized in certain emulsifications, and is useful in cotton textile processing and in paper making, since it has an affinity for the anionic cellulose fibers.

Hercules Powder Co., Dept. PVP, Wilmington 99, Del.

WATER SOLUBLE RESIN
Quick Dissolving

A new quick-dissolving water-soluble resin, Cellosize hydroxyethyl cellulose QP-4400, is now available commercially. The new grade of hydroxyethyl cellulose can be stirred into water solution almost as easily as sugar. There is no agglomeration as is the case when other water-soluble resins are stirred into water.

Cellosize QP-4400 is a nonionic thickener that is compatible with anionics, cationics, and nonionics. It is an efficient protective colloid and stabilizer and has a high tolerance for electrolytes. In water, Cellosize QP-4400 is non-gelling even at the boiling point of the solution. It has high thickening action, even in low concentrations, and is low foaming in water solutions.

Paints thickened with Cellosize QP-4400 have excellent scrub-ba bility. Shelf life and thermal stability are also improved through use of Cellosize QP-4400. The thickener can be dry-blended or ground with pigments because it allows instant color development when phthalocyanine colors are used to tint the hot latex paint system.

Cellosize QP-4400 can also be used in other thickening applications, such as topical drug preparations, cosmetic formulations, print pastes for the printing and textile industries, and agricultural chemicals.

Union Carbide Chemicals Co., Dept. PVP, 30 East 42nd St., New York 17, N. Y.

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Weber Air-Weigh Co., Dept. PVP, 13845 Elmira, Detroit 27, Mich.

YELLOW VAT PIGMENT
Weathering Fastness

New golden yellow vat pigment for automobile and other top-quality finishes is being introduced. Its transparency is of value in the production of brilliant clear finishes over bright metal, or when it is used in conjunction with metallic pigments to give gold shades of outstanding fastness, in either nitrocellulose or baking media.

The new pigment, which is a pure pigment dyestuff, has good dispersion properties and excellent stability in all types of media, showing considerable superiority over existing yellow pigments. It will be valuable as a shading component for greener-shade yellows and on its own it provides a useful basis for bright cream shades and sunshine yellows.

In alkyd baking enamels, "Monolite" Fast Yellow FRS has excellent heat fastness, with no tendency towards migration. It is non-blooming, non-bleeding, into white baking overspray lacquers, and its performance in nitrocellulose media is equally satisfactory. For these reasons this pigment is expected to find immediate acceptance in the important car finish field.

Subsidiary uses of importance are expected to be found in roller coating enamels and tin-printing inks, while in the plastics field the new pigment shows excellent stability in PVC, with very high light fastness and complete freedom from migration and contact bleed.

Chemicals Division, Canadian Industries Limited, Dept. PVP. P. O. Box 10, Montreal, P. Q.

1,4-DIOXANE
Wetting Agent

Availability of the solvent 1,4-dioxane, which has many applications in the paint industry, was announced.

The solvent will be available in 55-gallon drum and tank-car quantities at a delivered price from the firm's plant in Freeport, Texas. Until now, it has produced 1,4-dioxane only for its own use.

A cyclic ether, the chemical is used as a stabilizer for chlorinated solvents and as a solvent for cellulosic plastics, natural resins, mineral oils and vegetable oils. It also is an ingredient in solvents for the removal of paint, varnish and lacquer.

The textile industry uses 1,4-dioxane as a wetting and dispersing agent, as a dyeing aid and as an extraction agent. Dow said the product also has shown potential utility as a spinning agent for acetate fiber.

Soluble in water and a wide range of organic solvents, 1,4-dioxane is little affected by acids, alkalies and mild oxidizing agents.

Dow Chemical Co., Dept. PVP, Midland, Mich.

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*Waterproof beads have a molecular film (which becomes a permanent part of the bead) applied to the outer surface to prevent clotting or "clumping" before and during bead application. Waterproofing also prevents blanking out in wet weather.

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Microscopic Glass Beads for Industrial and Reflective Purposes

For more information circle No. 9—last page

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Consistency in Paint		Low	Low	Medium	Low	Medium Low	Low
Specific Gravity		5.95	5.85	5.85	5.75	5.75	5.70
Weight Per Solid Gallon (Pounds)		49.56	48.73	48.73	47.90	47.90	47.48
One Pound Bulks (Gallons)		0.02018	0.02052	0.02052	0.02088	0.02088	0.02106
Per cent Zinc Oxide (Approximate)		50	65	65	82	82	88
Per cent $PbSO_4$—PbO (Approximate)		50	35	35	18	18	12
Per cent Basicity (Expressed as Lead Oxide-PbO)		12–14	6.5–8.5	6.0–7.5	7–7.5	6–7	0.5–1.0
Specifications	ASTM	D80–41	D80–41	D80–41	D80–41	D80–41	D80–41
	Federal		TT-Z-321a	TT-Z-321a			

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For more information circle No. 10—last page

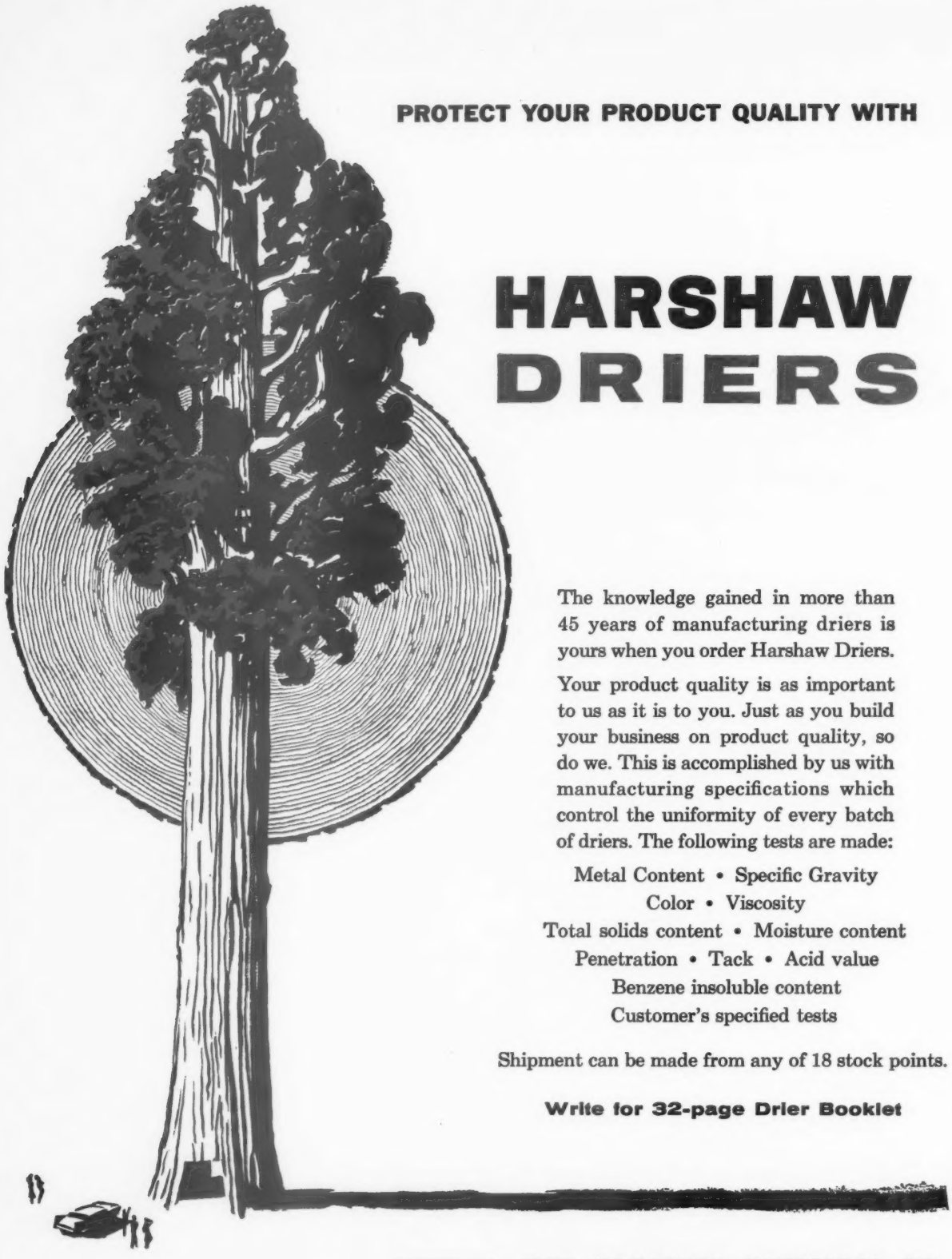
section 2

WORLD WIDE REVIEW of 1960

Developments in Paint Technology

Forty Publications Covered

Comprises over 550 References



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PUBLICATIONS

Below is a partial listing of journals used in abstracting items for this Review. Where *Chemical Abstracts* has been used as a source, the abbreviations are those employed by that abstract journal.

Abbreviations	*Full Title*
Aerosol Age	
Amer. Paint Jl.	American Paint Journal
Anal. Chem.	Analytical Chemistry
Chem. Abst.	Chemical Abstracts
Chem. Eng.	Chemical Engineering
Chem. Eng. News	Chemical and Engineering News
Chem. Ind.	Chemistry and Industry
Corr.	Corrosion
Corr. Prev. Cont.	Corrosion Prevention and Control
Corr. Tech.	Corrosion Technology
Electroplating	
Factory	
Farbe und Lack	
Fette, Seifen, Anstrichmittel	
Ind. Eng. Chem.	Industrial and Engineering Chemistry
Jl. Amer. Oil Chem. Soc.	Journal of the American Oil Chemists' Society
Jl. Oil Col. Chem. Assn.	Journal of the Oil & Colour Chemists' Association
Materials in Design Engineering	
Off. Digest	Official Digest of the Federation of Societies for Paint Technology
Paint Ind.	Paint Industry
Paint Jl.	Paint Journal
Paint Mfr.	Paint Manufacture
Paint Tech.	Paint Technology
Paint & Varn. Prod.	Paint and Varnish Production
Peintures, Pigments, Vernis	
Product Engineering	
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ALpine 6-1448

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GENERAL REVIEW ARTICLES

THE 1960 "Review and Buyers' Guide" of PAINT AND VARNISH PRODUCTION covers the literature in a survey that includes more than 600 references. Dealt with here are synthetic resins, latex emulsions, drying oils and derivatives, solvents and intermediates, pigments, driers and additives, production (including color control and matching), coatings, corrosion and application, aerosol coatings, testing and analysis. The "Review", in addition, carries an exhaustive listing of manufacturers of paint materials and processing equipment, under numerous useful subject headings. It should be noted here that the same journal, with the August, 1960, issue, inaugurated a valuable service; it will abstract every original article published in the Russian periodical *Lakokrasochnye Materialy i Ikh Primenenie*—the only Soviet journal devoted exclusively to the lacquer and paint fields. The abstracts carried in the 1960 issues of PAINT AND VARNISH PRODUCTION are cited elsewhere in this "Review" under particular subjects.[1]

The *Official Digest* for November, 1960, contains an important paper by Payne, who writes cogently of the "philosophy" of coatings. Noting substantial changes in the attitudes towards solution of problems of coatings, Payne relates these to contemporary scientific attitudes and developments. He emphasizes how much discoveries in related fields—of chemistry and physics for example—have affected the theory and practical application of surface coatings. Payne deals with atomic forces, electronic factors, atomic and ionic dimensions, bonds and bond formation, resonance; and he illustrates the application of some of the newer concepts in each of these areas. Further in his paper, he deals with a number of important compounds: those of carbon, boron, silicon, silicon-oxygen, fluorine, phosphorus.[1a]

A broad review by Scofield (with over 70 references) discusses recent developments in the protective coatings industry. "The most recent period has been devoted more to determining the place of the numerous film-forming materials introduced since World War II than to introducing new materials," notes the author. He goes into catalyzed finishes, water-thinned coatings, and protection of metals—particularly steel—from corrosion. He cites, also, the literature reviewing developments in broad areas, as well as in special fields.[2]

The French journal, *Peintures, Pigments, Vernis* has been carrying a very valuable series of technical reports on a wide variety of subjects, including compounds employed in paints and varnishes. These reports cover properties and applications in considerable detail. The reports are not numbered consecutively, so that the reader of this "Review" is referred to the Bibliography for exact dates and pages. Covered in the technical reports are ethyl amyl ketone, amyl acetate, waxes, indene and coumarone resins, polyethylene resins, polyvinyl butyrals, cyclohexane, isopropyl alcohol, *sym*-dichloroethylene, calcium carbonate, carnauba and other waxes of vegetable origin, beeswax, DDT, and titanium dioxide.[3]

Errico outlined trends for 1960, in an article that was both a forecast and an analysis of developments in drying oils, synthetic resins, water systems, solvents, pigments, and driers and additives.[4]

Brushwell, in an extensive review of the whole field, dealt with research developments, new products, processing, and applications.[5]

Continuing his series on "Advanced paint technology," Fisk contributes a number of papers to *Paint Manufacture.* These dealt with phenolic resins, amino resins, polyester resins, drying oils, polyamide and epoxy resins, polyisocyanates, vinyls, colors, and so on. The reader is referred to the Bibliography at the end of this "Review" for the exact listing.[6]

Two papers in PAINT AND VARNISH PRODUCTION cover the manufacture of paint and of color on the West Coast.[7, 8]

The February, 1960, issue of *Paint Technology* carried an economic review of the European paint industry during 1958. Production of paints, enamels, and varnishes, consumption and other figures are tabulated.[9]

Statistical data on the paint industry in the "Outer Seven" countries was cited in *Paint Manufacture.*[10]

An article in *Chimie des Peintures* covered the economic side of the paint industry in the Netherlands.[11]

A four-point paper by Morgan recalled the formation and early year of the Oil and Colour Chemists' Association.[12]

Margival, in a most illuminating series, dealt with techniques of painting in classical antiquity and in the Middle Ages. His articles would be of primary interest to the historian of art, since they deal with the paints and pigments of bygone artists. In this connection, an article in the same journal, dealing with the age of colors should be cited. This, again, is of antiquarian interest.[13, 14]

Paint Technology carries an article by Bhattacharya dealing with the use of shellac in the paint industry. Noting that "no individual resin, whether synthetic or natural, finds such varied applications in industries as lac does," the author reviews the place of shellac in modern paint formulation, citing some of the advantages of its use.[15]

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☐ **RCI SUPER-BECKAMINES** — melamine-formaldehyde resins for automotive finishes and appliance enamels.

☐ **RCI WALLPOLS** — polyvinyl acetate emulsions for wall sealers, flat wall coatings, spackling compounds and exterior stucco and masonry paints that are easy to formulate, easy to use.

☐ **RCI WALLKYDS** — drying oil alkyd resins for flat wall vehicles (including thixotropic types and vehicles specially developed for use with odorless solvents).

☐ **RCI BECKAMINES** — thermosetting urea-formaldehyde resins for use in giving special properties to alkyd vehicles.

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☐ **BECKOPOLS** — high melt point modified phenolic resins.
☐ **LUSTRASOLS** — copolymer modified alkyd resins.

☐ **RCI SYNTHEMULS**—acrylic emulsions for the manufacture of aqueous architectural and industrial finishes.

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For more information circle No. 13—last page

COATING RESINS

ONE of the interesting and recent trends in the field of acrylics has been the use of thermosetting acrylic resin solutions which cure at 300 deg. F. in about 30 minutes giving hard, glossy films with good resistance to soap, detergents and staining. Last year saw the introduction of low cost acrylic thermosetting resin for formulating baking-type finishes for air conditioning equipment, refrigerators and metal parts. This resin is compatible with a number of film formers such as epoxy resins, silicones, as several vinyl resins and nitrocellulose.

A rather new development in this field has been the introduction of a styrene/acrylate copolymer which is soluble in low-cost solvents—a feature which is claimed to offer distinct economic advantages over straight acrylics. According to the manufacturer, it dries rapidly to form tough, hard films which adhere to a variety of substrates with outstanding resistance to chemicals, sunlight and water.

Due to the current shortage of phthalic anhydride, manufacturers of alkyds have stepped-up their research, particularly in developing acceptable resins from isophthalic acid. When properly formulated, isophthalic-alkyd have three claimed advantages: abrasion resistance, impact resistance and speed of dry.

The Naval Stores Research Station of the USDA, Olustee Florida, reported on the development of a non-phthalic alkyd type vehicle using fumaric acid, maleic anhydride and pine oleoresin. These vehicles find use in trim enamels, concrete maintenance paints, and as a fortifier for linseed oil exterior paints.

Last year saw brisk activity in epoxy coatings. Straight-chain aliphatic epoxy resins which differ from conventional epoxies in structure, reactivity and end properties were unveiled in 1960. The most striking feature of these new epoxy resins is the reactive double bonds, which permit cures with peroxide catalysts.

A most interesting epoxy development within the last 12 months was anhydride-cured epoxy coatings. PMDA (pyromellitic dianhydride) can be adapted to use in epoxy coatings by reacting with glycols to form novel dianhydrides which are soluble in common organic solvents. Other epoxy developments include: the commercial availability of a new family of epoxides having cycloaliphatic structure, and a method for producing epoxy esters using a liquid epoxy resins, bisphenol A, and a drying oil fatty acid.

Progress in polyurethane coatings for marine use, floors, and exterior wood surfaces was noted in 1960. Of particular interest was the introduction of a one-can stable, quick-drying polyurethane for floor finishes, furniture finishes, prefinished paneling, aerosol finishes, marine finishes, etc. In addition to its fast drying properties, this product exhibits high hardness and yet is quite resilient.

Other resin developments include: a new group of high-molecular-weight, linear polyester solutions and a new film-forming resin made by chlorinating polypropylene.

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For more information circle No. 14—last page

Review Articles

The December, 1960, issue of *Paint Manufacture* carries a "Guide to New Resins," in which the properties and uses of solid resins, solutions of resins, and dispersions of resins that have been made commercially available in the last year are tabulated.[1]

Jordan reviews the history of binders, tracing their development from oils to resins and showing how the natural oils—principally linseed oil—have been replaced by resin binders, and how it is now possible to design the binder to fit the end product: a healthy example of practical science at its best.[2]

The fourth part of a study of paint vehicles by Dintenfass deals with microrheology: theory, classification and calculations. The author reviews, in technical detail, the theory of the subject, citing examples; then distinguishes these types of rheological systems: Newtonian, thixotropic, dilatant, thixodilatant, thixotropic dilatant with rupture, and dilatant with rupture. Dintenfass makes a number of points of practical significance: 1) size of molecular aggregate in resin or polymer solutions is influenced by solvent strength and temperature, but not by resin concentration; 2) molecular weight of resin solution can be measured at high concentrations (30-50%); 3) viscosity of resin solution is directly proportional to solvent viscosity while all other parameters remain constant; 4) the individual "history" of the sample is important; 5) solubility of resins and polymers is greatly influenced by their molecular weight distribution; 6) almost any resin type may show the various rheological behavior patterns described above, depending on solvent strength and temperature; and 7) skinning, swelling and gelation can be explained as factors of the hydrodynamic coefficient of the resins involved.[3]

Long devotes an article to "predetermined resins". His article reviews some of the fundamental chemical concepts; he "explores Beilstein", proposing, in fact, that some 5,000 compounds be selected from that source and catalogued for their properties: from this information it seems possible that new relations of composition to physical properties can be worked out. Ultimately, then, it might be possible to synthesize resins "on the basis of predetermined design".[4]

A detailed and technical paper by Alfrey and others deals with the molecular structure and mechanical behavior of macromolecules. The authors, emphasizing the tremendous variety of molecular structures, and corresponding variety of mechanical behavior of high polymers (natural and synthetic), cover chemical composition of the polymer, molecular architecture of the polymer chain or network, extent of crystallization (if any), and degree of swelling by low molecular weight substances (for example water), and nature of polymer-solvent interaction.[4a]

A literature review in *Paint Manufacture* covers the subject of synthetic resins.[4b]

Alkyds

Patton devotes a paper to a new concept for guiding the alkyd chemist in formulating and assessing alkyd compositions: this is that the ratio of total moles to acid equivalents for any properly formulated alkyd is unity. Actually, Patton points out that this alkyd constant may be slightly increased in practice, proposing that 1.01 is a "reasonable working constant" for phthalic anhydride and that 1.05 works similarly for isophthalic acid alkyds.[5]

Powanda and others outline a "new approach" to trimethylolpropane alkyd resins; this involves the use of tall oil fatty acids in addition to the propane. Citing their findings, the authors claim that coatings based on these materials give excellent color retention, hardness, resistance to alkali and boiling water, and high impact resistance.[6]

An article by Benson discusses "Aqualons", water-miscible alkyds which are expected to be commercially available early in 1961. His review covers resin compatability, alkali resistance, and urea-formaldehyde resin modification of "Aqualons"; the author points out that his information bears on the use of the new products in baked finishes, either as sole vehicle or in combination with a latex.[7]

Garland and Werthan deal with the formulation of alkyd flat wall paints. Their paper, based primarily on a study of the influence of pigmentation variables on film properties (more than 700 test paints were prepared and examined), presents a "graphical" method for formulating alkyd paints.[8]

A paper in the *Official Digest* deals with the commercial production of isophthalic acid alkyd resins. The fundamental chemistry is reviewed, thermal stability is discussed, and practical results using a 4000 ml. reactor heated with a glas-col mantle, and equipped with an agitator, inert gas regulator, air condenser and recording thermometer, are covered. Factory production of these experimental resins is considered, along with some of the problems entailed. The point is emphasized that isophthalic acid is a different building block from the other isomers of phthalic acid; infra-red spectra and other curve results are adduced to support this thesis.[9]

Helme and others discuss hydrogenated castor oil, pointing out that alkyd resins based on this oil may be used in the place of alkyd resins based on copra oil or lauric acid, without any lowering of properties.[10]

A paper by Baranyai covers a method for calculating the viscosities of alkyd solutions. The theory applied here is based on a comparison of ideal and actual behaviors; in his article, Baranyai introduces three new terms: ideal solids, ideal logarithmic viscosity number, and viscosity factors. Detailed tables show how the difference between determined and calculated viscosities for different types of alkyd solution are arrived.[11]

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Review Articles

The December, 1960, issue of *Paint Manufacture* carries a "Guide to New Resins," in which the properties and uses of solid resins, solutions of resins, and dispersions of resins that have been made commercially available in the last year are tabulated.[1]

Jordan reviews the history of binders, tracing their development from oils to resins and showing how the natural oils—principally linseed oil—have been replaced by resin binders, and how it is now possible to design the binder to fit the end product: a healthy example of practical science at its best.[2]

The fourth part of a study of paint vehicles by Dintenfass deals with microrheology: theory, classification and calculations. The author reviews, in technical detail, the theory of the subject, citing examples; then distinguishes these types of rheological systems: Newtonian, thixotropic, dilatant, thixodilatant, thixotropic dilatant with rupture, and dilatant with rupture. Dintenfass makes a number of points of practical significance: 1) size of molecular aggregate in resin or polymer solutions is influenced by solvent strength and temperature, but not by resin concentration; 2) molecular weight of resin solution can be measured at high concentrations (30-50%); 3) viscosity of resin solution is directly proportional to solvent viscosity while all other parameters remain constant; 4) the individual "history" of the sample is important; 5) solubility of resins and polymers is greatly influenced by their molecular weight distribution; 6) almost any resin type may show the various rheological behavior patterns described above, depending on solvent strength and temperature; and 7) skinning, swelling and gelation can be explained as factors of the hydrodynamic coefficient of the resins involved.[3]

Long devotes an article to "predetermined resins". His article reviews some of the fundamental chemical concepts; he "explores Beilstein", proposing, in fact, that some 5,000 compounds be selected from that source and catalogued for their properties: from this information it seems possible that new relations of composition to physical properties can be worked out. Ultimately, then, it might be possible to synthesize resins "on the basis of predetermined design".[4]

A detailed and technical paper by Alfrey and others deals with the molecular structure and mechanical behavior of macromolecules. The authors, emphasizing the tremendous variety of molecular structures, and corresponding variety of mechanical behavior of high polymers (natural and synthetic), cover chemical composition of the polymer, molecular architecture of the polymer chain or network, extent of crystallization (if any), and degree of swelling by low molecular weight substances (for example water), and nature of polymer-solvent interaction.[4a]

A literature review in *Paint Manufacture* covers the subject of synthetic resins.[4b]

Alkyds

Patton devotes a paper to a new concept for guiding the alkyd chemist in formulating and assessing alkyd compositions: this is that the ratio of total moles to acid equivalents for any properly formulated alkyd is unity. Actually, Patton points out that this alkyd constant may be slightly increased in practice, proposing that 1.01 is a "reasonable working constant" for phthalic anhydride and that 1.05 works similarly for isophthalic acid alkyds.[5]

Powanda and others outline a "new approach" to trimethylolpropane alkyd resins; this involves the use of tall oil fatty acids in addition to the propane. Citing their findings, the authors claim that coatings based on these materials give excellent color retention, hardness, resistance to alkali and boiling water, and high impact resistance.[6]

An article by Benson discusses "Aqualons", water-miscible alkyds which are expected to be commercially available early in 1961. His review covers resin compatability, alkali resistance, and urea-formaldehyde resin modification of "Aqualons"; the author points out that his information bears on the use of the new products in baked finishes, either as sole vehicle or in combination with a latex.[7]

Garland and Werthan deal with the formulation of alkyd flat wall paints. Their paper, based primarily on a study of the influence of pigmentation variables on film properties (more than 700 test paints were prepared and examined), presents a "graphical" method for formulating alkyd paints.[8]

A paper in the *Official Digest* deals with the commercial production of isophthalic acid alkyd resins. The fundamental chemistry is reviewed, thermal stability is discussed, and practical results using a 4000 ml. reactor heated with a glas-col mantle, and equipped with an agitator, inert gas regulator, air condenser and recording thermometer, are covered. Factory production of these experimental resins is considered, along with some of the problems entailed. The point is emphasized that isophthalic acid is a different building block from the other isomers of phthalic acid; infra-red spectra and other curve results are adduced to support this thesis.[9]

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falling on the test panel, the total energy greater than a fixed threshold value being most nearly related to rate of deterioration. In this connection, the author notes that intensity rather than duration of sunshine causes failure. In the course of his studies, Oakley was unable to demonstrate any direct relationship between film failure and moisture, although he assumes it to play an important role.[12]

A review of current knowledge of the chemistry and technology of oil-modified alkyd resins is carried in a Russian journal. Dealt with are industrial methods of alkyd resin synthesis. Current efforts in the USSR emphasize the development of the continuous synthesis of alkyd resins, the widening of bases for raw materials for resin manufacture, and quality improvements, by modification of resins with various types of materials—e.g., the many reactive groups present in alkyd resins.[13]

Patents

A. N. Walus (assignor to E. I. du Pont) patented a coating composition comprising nitrocellulose and alkyd resin. This is a light colored liquid coating which produces a dry coating characterized by resistance to discoloration from contact with oil, grease, tar, rubbery adhesives and the like; it includes a pigment, volatile organic solvent and organic film-forming material consisting of (a) lacquer grade nitrocellulose, and for each part by weight of nitrocellulose, (b) 0.5-1.5 parts by weight of alkyd resin containing a phthalic acid moiety, containing unesterified hydroxyl groups equivalent to 1.5-7% by weight of glycerine (acid number less than 15, and modified with 40-50% by weight of hydrogenated castor oil with an iodine number of less than 8); and (c) up to 0.6 parts by weight of plasticizer; the total weight of (b) and (c) is 1.0-1.5 times the weight of (a).[14]

Epoxies

Gough and Smith discuss accelerated amine curing of epoxy resins. The particular resin they used was Epikote 828 (Shell Chemical Co., Ltd.); accelerated curing was effected by an alkenyl substituted heterocyclic polyamide containing primary, secondary and tertiary amine groups (Synolide 960; Cray Valley Products, Ltd.) Several additives were tested; among others used on test compounds were methyl ethyl ketone, water, acetamide and salicylic acid, propane 1,2- diol and *p*-toluenesulfonic acid monohydrate. Water was found to be a powerful accelerator; methyl ethyl ketone retarded the reaction. In general, acids, phenols, amides and sulfonamides seem good accelerators; if fast curing is desired in surface coatings, ketones and esters should be avoided in formulation. The authors make the point that varnish and paint technologists ought to study their solvents from the viewpoint of curing characteristics as well as film-forming properties, although this observation is not considered to apply to resins above a certain molecular weight, because of their higher hydroxyl content. It is interesting, also, that humidity of the atmosphere is a factor in application, especially in spraying, since the presence of water accelerates drying.[15]

High-styrenated epoxide esters are discussed by Allsebrook. New products with a high content of styrene, low acid value, and good viscosity, are said to have good compatability with hardening resins, and can be used to prepare white stoving finishes with excellent resistance properties.[16]

The systhesis of epoxides is reviewed by Smith, who covers methods of preparation (oxidation techniques and chlorohydrin processes), and ventures some remarks on future developments. He considers that the next few years will see an increased interest in the use of pre-formed peracetic acid and a continued diversification of the types of epoxide available.[17]

The application of styrenated-acrylated epoxy-DCO resins to industrial coatings is subject of a paper by Kovacs and Zarb. To make certain of these resins more flexible, their "internal plasticizing" effect was utilized. Kovacs and Zarb described the preparation of resins and the properties of enamels, indicating that, by the use of their procedure, as much as 100 per cent monomer treatment of an epoxy-DCO resin is possible without impairment of the flexibility of the enamels. However, gloss and flow are inferior.[18]

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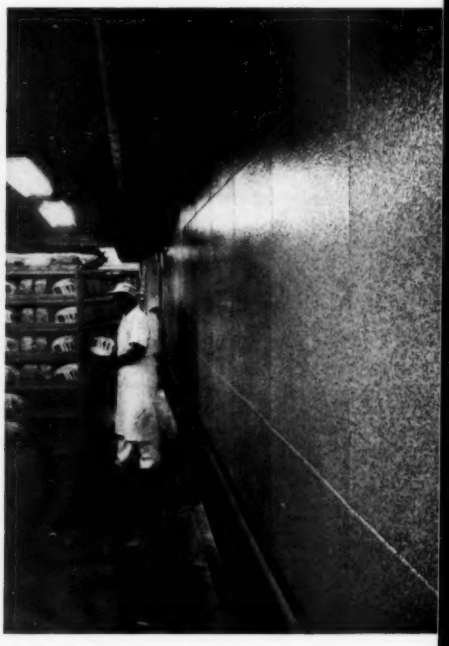

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Hyde deals with new anhydride-cured epoxy coatings. Adducts of high solubility in ketone or ester solvents were prepared by reaction of 2 moles of pyrometallitic dianhydride with 1 mole of various glycols. Coatings containing conventional solid epoxy resins and the PDMA-glycol adducts were developed; they showed an "excellent balance" of physical properties and solvent resistance, after a cure of 15-30 minutes of 300°F.[19]

A paper by Turner and Ranger reviews recent advances in the use of epoxide resins in surface coatings. They discuss "high-solids" systems and water-thinned stoving compositions; both of these may be prepared with epoxide resins.[20]

An article by Wynstra, Kurkjy and Reinking deals with a novel way of preparing epoxy resin varnishes from a liquid epoxy resin, bisphenol A and a drying acid. The technique exploits the selective manner in which glycidyl ethers can be made to react with carboxylic acids and phenols in the presence of base catalysts.[21]

Epoxy resins in the paint and varnish industry were reviewed in a Russian periodical; the authors covered synthesis of epoxy resins, with numerous tables and graphs indicating relationships of various parameters; reactions of epoxies with compounds containing amino groups; reactions with organic acids and their anhydrides; modified epoxy resins.[22]

A two-component coating based on epoxy resin and polyisocyanate is subject of an article in *Farbe und Lack*. The author (Detsch) found that using 9.3% polyisocyanate as hardener, he obtained an epoxy resin containing 10% ketone resin from an air-drying film on metal with good physical and chemical properties.[22a]

Writing of the hardening of epoxy resins with polyamines, Lissner attributes this property to an addition reaction which forms polyhydroxyamines.[22b]

Patents

An American patent granted to H. L. Moroson (assignor to Reichhold Chemicals, Inc.) covers an epoxy resin. This treats a process of producing a liquid epoxy resin which comprises initially reacting diphenylolpropane and epichlorohydrin in the proportion of 2 to 3 moles of epichlorohydrin to 1 mole diphenylolpropane under alkaline conditions at a temperature within the approximate range of 40-70°C, to produce a resin intermediate, thereafter adding to the resinous reaction mixture from 10-25% of its weight of epichlorohydrin and then azeotropically stripping the resinous intermediate to produce a final liquid resin of desired viscosity with substantially complete recovery of the added epichlorohydrin.[23]

United States patent 2,934,516 (to D. D. Hicks, Devoe & Reynolds Co., Inc.) deals with carboxy-copolymer epoxide compositions and their preparation. A process for preparing thermoset resins which comprises (a) mixing (1) a polyepoxide selected from the group consisting of epoxidized esters and epoxidized diolefins, each having at least two epoxide groups; glycidyl polyethers of polyhydric alcohols; and glycidyl polyethers of polyhydric phenols; (2) a dicarboxylic acid-aromatic alcohol acid ester wherein the dicarboxylic acid is selected from the group consisting of maleic acid and fumaric acid, and the aromatic alcohol from the group consisting of phenylcarbinol (other compounds are also listed); and (3)

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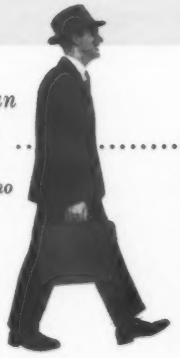

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a vinylidene compound selected from the group consisting of styrene (a large number of other compounds is mentioned). The mixture contains 1-2 epoxide groups of (1) per carboxyl group of (2), and from 20-70% of (3) by weight based on the total composition; the mixture is (b) heated at 65°-150°C.[24]

One of the same patentees, with J. E. Masters and W. J. Belanger (assignors to the same corporation) patented an epoxide resin composition; resins resulted from a process which comprises, at a temperature of 80°-200°C, mixing and simultaneously reacting a glycidyl polyether of a dihydric phenol containing more than one epoxide group per molecule,and having a weight per epoxide below 1000, a polyhydric phenol having at least two phenolic hydroxyls as its sole reactive groups, and a polycarboxylic acid anhydride in a ratio of two epoxide equivalents of glycidyl polyether to from 0.2-1.5 phenolic hydroxyl equivalents of polyhydric phenol of from 0.5-2 equivalents of the polybasic acid anhydride, to produce an insoluble, infusible resinous composition.[25]

Mayurnik (to Aries Laboratories, Inc.) patented epoxy resin compositions; these are the heat condensation product of a resinous glycidyl polyether of a polyhydric phenol which ether is free from functional groups other than epoxy and hydroxy groups, and an amount sufficient to react with all the epoxy groups present of a mixture of two dicarboxylic anhydrides consisting of monomeric adipic and succinic, monomeric adipic and phthalic, monomeric adipic and sebacic, polymeric adipic and monomeric phthalic, polymeric sebacic and monomeric phthalic, and polymeric adipic and monomeric sebacic anhydrides, the molar proportion of the dicarboxylic anhydrides of the dicarboxylic anhydrides in said mixture ranging from about 1.1-1.2.[26]

Phenolics

In a Russian journal, Sakharnov deals with the problems of purification of phenol of waste waters from the production of diphenylolpropane and phenols resins. His paper is concerned with a description of current and proposed methods—regeneration techniques of purification (phenol extraction, etc.), ion exchange, adsorption, biochemical purification, perchlorination, ozone, and oxygen treatment. The author describes the work done in Russia using diisopropyl ether in a rotary extractor.[27]

Patents

Modified phenolic resins are subject of a patent granted to Backer (assignor to Allied Chemicals Corp.) This is a process for production of non-heat reactive para-alpha-cumylphenol-para-substituted-phenolformaldehyde resin, said to have outstanding chemical and physical characteristics adapted particularly for special surface coatings.[28]

Polyamides

In *Verfkroniek* Götze discusses specific problems in the fabrication and application of Versamid/epoxy resin lacquers. He considers the influence of solvents and pigments, the effect of catalysts, and the application of these systems, which must take a number of factors into consideration. He points out that good results can be obtained only with an optimum exploitation of application and film properties.[29]

Glaser and Floyd devote a long paper to results of exposure studies of Versamid/epoxy coatings. Their tests were made on primers and enamels based on vehicles made from blends of Versamid polyamide resins and epoxy resins. These were subjected to natural and accelerated weathering, tide-water exposure, salt spray, and humidity cabinet tests, contact with acids and other chemicals, and other special tests.[30]

Polyesters

A review by Buisseret covers polyester resins: their chemistry, manufacture, polymerization, and applications.[31]

A three-part article by Allen deals with polyester resins wood finishes. The author cites the advantages and disadvantages in their use, and comments on the mechanism of their drying; in the later parts of his article he considers applications.[32]

Kostiuk discusses the development of varnishes based on unsaturated polyester resins, which because of their properties are finding particular application in the field of wood furniture.[33]

An article in a Russian journal dealt with the synthesis of unsaturated polyester resins and the preparation of lacquers using them. This was a review article, based largely on the Western technical literature, and covered composition of unsaturated polyester lacquers, and basic materials for their preparation; polyester lacquers noninhibited by air; mechanism of polyester resin formation on the maleic anhydride base; technology of manufacture and application of polyester lacquers and areas of use of these materials.[34]

Patents

Pigmented-dextran modified polyesters are subject of an American patent assigned to The Commonwealth Engineering Co., Dayton. This is a method of making a pigmented dextran-modified resin which consists in heating a mixture of a polyhydric alcohol and a polycarboxylic acid or anhydride thereof to reaction temperature and producing a liquid resinous mass; thereafter adding to this a powdered mass composed of pigment and

water-insoluble dextran to produce a pigmented dextran-modified resin, the resin forming constituents being admixed and reacted together in the proportionate amounts in parts by weight consisting of diethylene glycol (530 parts), fumaric acid (638 parts), and tetrahydroabietic alcohol (146 parts); heating the mixture for about four hours at 180°C, and adding to the resultant reaction mixture 146 parts of tetrahydroabietyl alcohol; and heating the resultant resin-forming constituents to a temperature of about 200°C for approximately one and one-half hours, to distill off the water released in the reaction.[35]

United States patent 2,934,513, dealing with modified polyesters, covers a process for the production of thermoplastic polyesters which comprises concomitantly reacting a monoepoxide, a dihydric phenol and a dicarboxylic acid anhydride at an elevated temperature below which water of esterification is formed; the molar ratio of dicarboxylic acid anhydride to monoepoxide is $n:n-n:n+2$, where n represents the number of moles of anhydride, and the molar ratio of anhydride plus monoepoxide to dihydric phenol being greater than 4:1.[36]

Polyurethanes

Recent developments in polyurethanes are surveyed by Hampton, Hurd and Shearing. Their review includes polyethers, polyisocyanates; their application in industry other than as paints, with particular reference to very low toxicity rigid polyurethane foam systems and to polyisocyanates useful for surface coatings. With regard to polyisocyanates, the authors venture the opinion that in the near future such compounds will be developed possessing no greater toxicity than the ester and ketonic solvents in which they are used.[37]

Bailey and others consider in detail the correlation of properties with structure in urethane coating polymers. They review the chemistry, types and properties of such coatings, including molecular structure and film properties.[38]

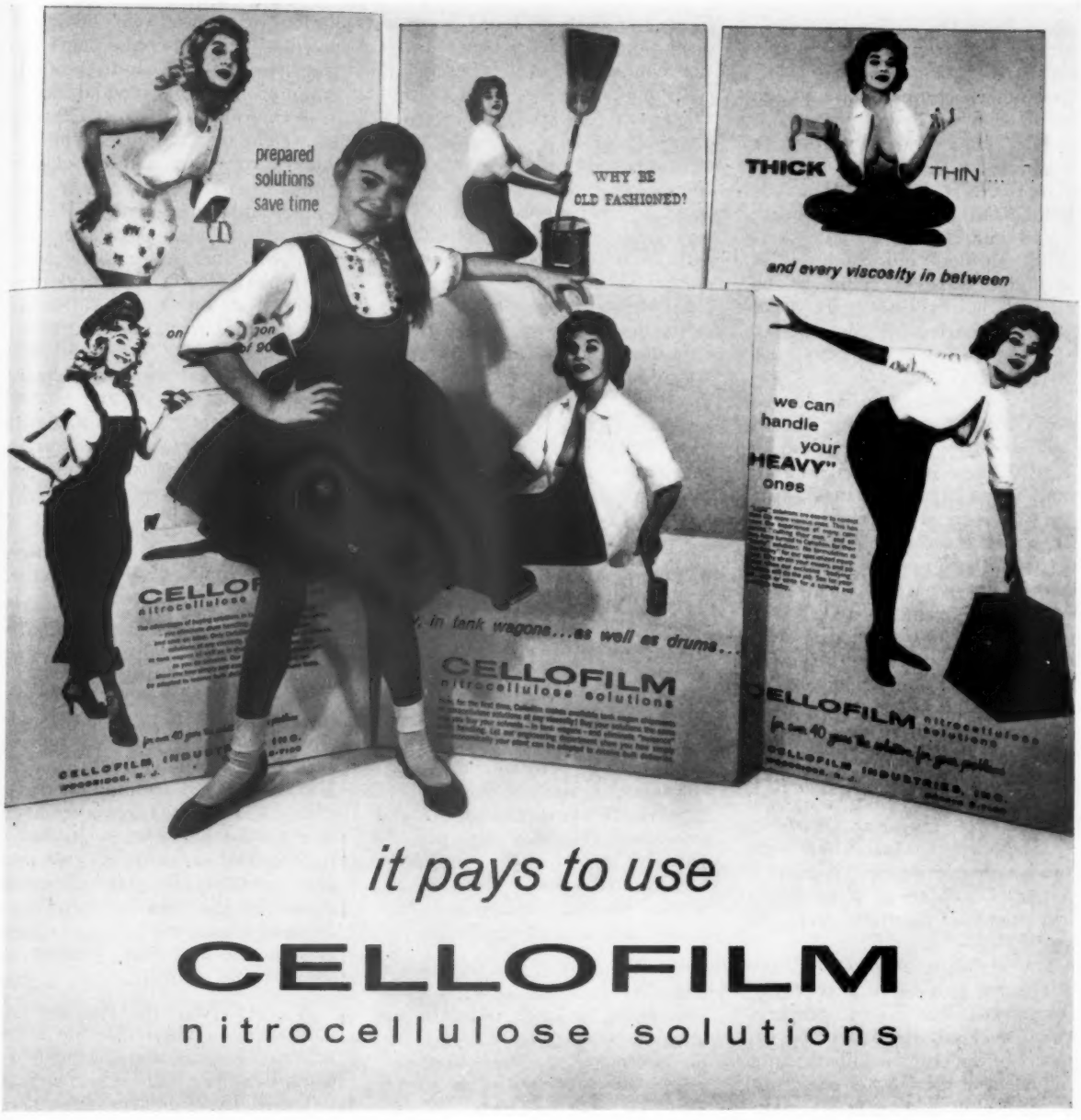
The February, 1960, issue of the *Official Digest* carries a symposium on polyurethane coatings. As an introduction to the symposium, Bailey discusses the chemistry and fundamentals of these coatings.[39] The next paper, by Glasbrenner and others, reports statistical studies on one-package polyurethane surface coatings; one of these is cured by reaction of the film with air moisture, the other is cured by baking. Relationships of film hardness and toughness to formulation variables were determined.[40] Following this, a paper by Hudson and others discusses baked polyurea coatings; these are cured at an elevated temperature, and may be applied from a water base. They are formed by reaction of urethanes with amine-bearing resins; the resulting coatings have good resistance to acids, alkalis, and to water-immersion. In addition, they have good flexural and hardness properties. Industrial applications for these coatings are discussed.[41] The next paper, by Patton and Metz, discusses urethane coatings made from castor polyols; both prepolymer and polyisocyanate type systems are considered.[42] Toone and Wooster deal with diisocyanate adduct coatings based on castor oil; properties for adduct coatings of these products and tolylene diisocyanate are cited in detail: increased tensile strength, faster drying times, greater hardness, improved solvent resistance, and lower moisture permeability.[43] Continuing the symposium, a paper by Wilson and Stanton deals with the reactions of isocyanates with drying oils; it is noted that urethane oils prepared from alkali refined linseed and soybean oils showed superior dry and film hardness when compared with products based on prebodied oils. Moreover, paints based on the urethane oils prepared with alkali refined linseed oils compared favorably in exposure tests with a long oil soybean alkyd.[44] Next paper in the series, by Damusis and others, considers polyether polyols in urethane coatings. One and two-component urethane coatings were prepared and examined. The physical properties of the final coatings were measured, and some of the possible applications were ventured.[45] Final paper in the symposium is by Bieneman and others; they propose a method for the formulation of stable pigmented coatings systems based on polyurethane prepolymers: reactive residues present in the pigment are pre-reacted with isocyanates prior to dispersion in the prepolymer. Paints prepared by this procedure are said to possess good can stability and film-forming properties.[46]

Bailey and others discuss one-can urethane coatings—coatings possessing the storage stability and ease of application of ordinary coating vehicles. Various formulations are cited. Production differs from that of the usual alkyd in that a diisocyanate is used instead of a dicarboxylic acid or anhydride.[47]

A paper by Ball and others is devoted to the sound absorption properties of urethane foams. The authors found that such foams, either preformed and cut, or sprayed, show good to excellent sound absorption properties. Certain physical properties of the foam affect these absorption properties,-e.g., cell type, thickness. The authors cite maximum conditions for application.[48]

Patents

A patent issued to Jerves (assignor to American Cyanamid Co.), covers blends of urea-formaldehyde resins. A stable, hydrophilic, potentially thermosetting resinous product comprising a physical blend of a partially polymerized, partially alkylated, water-soluble urea-aldehyde condensate and a partially polymerized, water-soluble bisulfite-modified thiourea-formaldehyde condensate containing in 100 parts by weight of the blend 55-88 parts of the former, and 45-40 parts of the latter, said alkylated urea-aldehyde component being prepared by reacting in proper aqueous medium relative proportions of 1.50-2.25 moles of a water-soluble aliphatic aldehyde with 1 moles of urea; the urea-aldehyde condensate is reacted at a temperature of 70-100°C with 0.3-2.0 moles of an aliphatic alcohol (1-3 carbon atoms); the reaction mixture is then neutralized, the bisulfite-modified thiourea component being prepared by reacting in aqueous medium relative proportions of 0.4-1.4 mols of formaldehyde, .01 to .06 mol of a material selected from the group consisting of water-soluble bisulfite (and certain sulfites), and 1 mol of thiourea, pH 7.0-10.0, at a temperature of 50-100°C; then blending these respective components in the weight ratio set forth above.[49]



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Silicones

Blends of conventional paint vehicles with special silicone resins are formulated at reasonable cost to give finishes capable of withstanding high temperature, according to an article in the August issue of PAINT AND VARNISH PRODUCTION. Specifically, the finish is used as a coating for truck and tractor mufflers and manifolds in the military field; it might be extended, however, to such civilian uses as a coating for lawn mower exhausts.[50]

Patents

Room temperature curing silicone resins were patented by H. A. Clark (assignor to Dow Corning Corp). These involved a resinous composition capable of curing in a thin film at room temperature, and comprised reaction product of a mixture of two organopolysiloxane components in each of which each organopolysiloxane has attached to the silicone atoms by silicone-carbon bonds an average per silicone atom of 1.2-1.7 monovalent hydrocarbon radicals.[51]

Hilliard covers new developments in the soluble vinyl aromatic diene copolymer paint resin field. His paper discusses the physical and chemical properties of a new vinyl toluene butadiene copolymer resin and its application in paints, as well as some recent developments resulting from its use.[51a]

The stability of polyvinylchloride is the subject of a paper by Dodgson. This is a property which is closely dependent on the nature of the polymer substituents, and effect of these latter on certain properties (for example, heat stability) can be readily shown. Dodgson notes that the literature on the subject of stability of these compounds is contradictory; he cites several known factors—discussing, among other things, the range of stabilizers available.[51b]

A detailed paper by Arzens deals with Mowilith (Hoechst A. G.), its chemistry and applications; the product is a polyvinyl acetate.[51c]

Vinyls

Patents

A number of patents covering vinyl compounds were issued during the year. Among these we cite one issued to V. L. Hiuska and P. J. Lurie. This is a composition said to be suitable for use as an electrical insulation material, the composition comprising, in admixture, 100 parts of vinyl resin selected from the group consisting of polyvinyl chloride and co-polymers of vinyl chloride and vinyl acetate, there containing at least about 95% of vinyl chloride in polymerized form, from about 5-40 parts of unbleached clay, from about 2-10 parts of lead stabilizer, and from about 304 parts of at least one member selected from the group consisting of epoxidized fatty acids having from about 8-22 carbon atoms, therein including the epoxy group and esters of said epoxidized fatty acids with an acid esterifying compound consisting of aliphatic alcohols, cycloaliphatic alcohols, aryl hydroxides and aralkyl alcohols.[52]

Another patent (R. W. Quarles and W. H. McKnight; assignors to Union Carbide Corp.), covers a resinous film-forming composition comprising an aqueous dispersion of a vinyl chloride polymer selected from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate containing at least 85% by weight of vinyl chloride polymerized therein, and copolymers of vinyl chloride and vinylidene chloride; and, per 100 parts by weight of the vinyl polymer, up to 3 parts by dry weight of a water soluble polymer of an N,N dialkyl-substituted acrylamide.[53]

Gordon and Cohgen (to The Borden Co.) patented a water paint comprising an intimate mixture of an aqueous emulsion of the product of polymerizing 100 parts dry weight of vinyl acetate in contact with (1) an activator of polymerization of vinyl acetate, (2) 2-10 parts of pregelatinized waxy maize starch in solution in water at all times during the polymerization, and (3) 0.5-5 parts of a surfactant selected from the group consisting of anionic and nonionic surfactants, the emulsion serving as the vehicle for the paint; and 20-200 parts of paint pigment admiced with the said vehicle, the vinyl acetate being in substantially completely polymerized condition.[54]

United States patent 2,921,917 covers a method of stabilizing halogen-containing resins with a liquid stabilized in an amount of about 0.5-5% by weight of the resin; the method comprises (1) mixing a powdery halogen-containing resin (consisting of at least 65% of the group of vinyl chloride and vinylidene chloride), with about 25-60% by weight of a stabilizer which is liquid at room temperature, selected from the group of organotin compounds and soap of a metal selected from the alkaline group metals, cadmium, zinc, lead, and tin, with an aliphatic carboxylic acid containing more than 6 atoms, heating said mixture to a temperature of about 175-200°F, cooling it, thus obtaining a free flowing resin powder rich in stabilizer, and adding said powder to additional amounts of said halogen-containing resin in such proportion that the final blend contains about .5-5% of the stabilizer.[55]

Vinylidene polymer compositions are patented by Coler and Louis. These are compositions of matter comprising a polymer of a vinylidene monomer and containing a destaticizing additive consisting of from 1-50% by weight, based on the weight of the polymer, of an ammonium salt produced by reacting (1) a totally hydroxyalkylated amine (the formula is cited), with (2) acid, the proportion of acid to diamine being such that a hydrogen attaches to at least one and not more than both nitrogen atoms of the diamine; and the resulting compound having a vapor pressure of less than 760mm at 225°C.[56]

A vinyl chloride composition comprising a vinyl chloride resin containing epoxidized diesters of 3-cyclohexene-1,1-dimethanols was patented by Starcher and others (to Union Carbide Co.)[57]

United States patent 2,924,582 covered vinyl resin stabilized with epoxy compounds.[58]

Interpolymers of blown oils and vinyl mixtures were patented by R. M. Christenson (to Pittsburgh Plate Glass Co.)[59]

United States patent 2,940,946 covers alkyl alcohol-vinyl aromatic copolymers.[60]

Elliot (assignor to Ferro Corp.) patented a method for stabilizing halogenated hydrocarbon resins; the stabilizer comprised an intimate admixture of pentaerythritol, zinc oxide, and barium oxide.[61]

Miscellaneous

In a survey of amino coating resins, Schollick points out that a study of the properties of epoxy and amino resins, including their ultra-violet absorption spectra, may lead to significant deductions concerning the effect of combining various resins, with a resultant improvement of film formation and chemical resistance.[62]

Bradshaw devotes an article to bitumen emulsions. In particular, he discusses chemical and mechanical emulsions, noting that the former, when prepared by competent makers from bitumens of satisfactory acid value, differ little in performance from good mechanical emulsions.[63]

A highly technical paper by Johnston deals with gelation and formulation theory of ester resins.[64]

In *Official Digest* Koenecke and Van Nostrand cover the subject of synthetic polymers of petroleum origin intended for coatings. Their article covers nature of the polymer, film formation and films, uses.[65]

A paper by Strong, in the *Journal of the Oil and Colour Chemists' Association*, deals with the introduction of butyl and polyisobutylene in sealants. The author points out that low molecular weight polyisobutylene is well established as a minor constituent in sealants, and adds that the use of the related, low-cost butyl rubber—an isobutylene-isoprene copolymer—presents some desirable features. Actually, as Strong emphasizes, the term "butyl sealant" can apply to materials manufactured by entirely different procedures, with a wide range of properties.[66]

Recent advances in the chemistry and technology of fatty acid condensation products are reviewed by Mills and Hammond. Their paper covers the chemistry of the condensation process, some varnish making studies, compatability tests, film-forming properties. The authors noted several striking differences in the behavior of stand oil and the new products they worked with—some of these probably related to structural considerations.[67]

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WATER-THINNED RESINS

SALE of latex paints for 1960 reached some 77 million gallons. The bulk of this volume was used on interior and exterior masonry surfaces, but some two million gallons were used for exterior wood.

Consumer reaction to latex exterior house paints was most favorable because of the remarkable performance qualities of these paints plus their easy-application and clean-up features. However, latex paints for exterior wood have two serious drawbacks: (1) poor adhesion to bare wood and (2) poor adhesion over chalky old paint films.

To circumvent these problems, manufacturers recommend the use of an oil primer on bare wood and chalky surfaces.

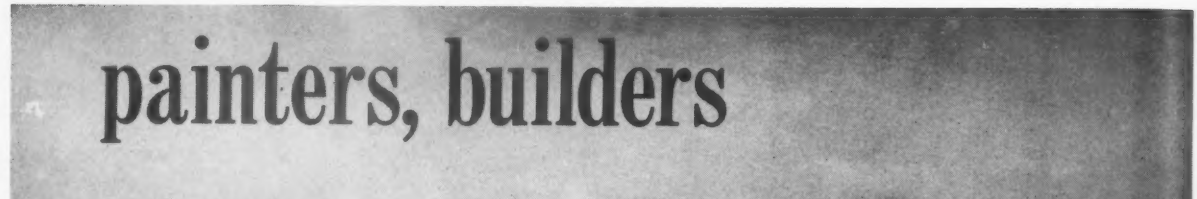
On the other side of the ledger, exterior latex paints have some striking advantages over oil-base systems. These include superior chalking qualities, a film life expectancy of 50 percent greater than conventional exterior oil paints and better color retention.

The great interest displayed in fire-retardant-intumescent paints has spurred emulsion manufacturers to develop special products for formulating paints which will meet present-day building codes for schools and other public buildings. In this connection, a single package, interior paint having good shelf stability and effective in protecting flammable substrates was recently developed.

In the industrial field, water thinned finishes show continued growth and progress. For example, 1960 saw the introduction of thermosetting acrylic emulsion for the production of water reduced baking enamels which are tough, flexible, hard and glossy. Single coat enamels baked for 30 minutes at 350 degrees F. on cold rolled steel give excellent flexibility over 1/8" mandrel and will stand immersion in water for 8 hours at 165°F. with good wet adhesion and with no blistering.

A new water soluble, thermosetting resin which overcomes three major industrial painting problems—fire, solvent toxicity and odor- was unveiled at last year's Paint Show in Chicago. This resin is designed specifically for industrial baking finishes having high hardness, fast curing, high impact resistance, water and solvent resistance, good adhesion and flexibility. Test show that this resin can be formulated into an automotive paint primer which performs at least as well as current epoxy resins. Other applications for this water-soluble resin are industrial top coat paints for steel drums, coated strip steel, metal toys and other similar uses.

Homeowners,



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Flexbond Vinyl Latex Paints

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Homeowners are happy because paints based on Flexbond Vinyl Latex have a soft, uniform, long-lasting finish. The paint coat resists blistering and peeling...keeps its "just painted" freshness longer.

Painting contractors appreciate the way paints formulated with Flexbond Vinyl Latex glide over surfaces, cover thoroughly without brush marks. Painters put in more productive time as there is no waiting for just the right weather. Too, soap and water quickly cleans hands, brushes and equipment.

Home builders find that the beautiful finishes help sell homes.

Other advantages of Flexbond Vinyl Latex-based paints: they dry quickly, won't pick up dirt, the colors resist fading and whites stay white.

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Emulsions for Exterior Use

Practically the entire October, 1960, issue of PAINT AND VARNISH PRODUCTION is devoted to latices. First article (Jaffe and Fickenscher) deals with vinyl latex emulsions; such questions as polymer strength, formulation, pigmentation and printing are dealt with here. The authors review the properties—and the advantages—of latex emulsion paints, and cite formulas for an exterior white, an exterior tint base and an experimental exterior wood primer.[1]

Second paper in this issue, by Roth and Terry, goes into the problems of formulating exterior emulsion paints. Oil-based primers and several experimental emulsions are covered, among these latter a vehicle said to exhibit high durability and good water-spot resistance in preliminary exposure tests.[2] Following this article, Broughton and Sale review the advantages and some disadvantages of vinyl emulsion paints for exterior wood use. Their conclusions are based on extensive tests. Among the problems they discuss are flexibility and distensibility, dimensional stability and water absorption, staining, chalking, and that color retention. In the area of formulation they touch on selection of white pigment, thickening agents, surfactants, mildewicides, consolidating agents, pigments, and pigment volume concentration.[3]

Fourth paper in the issue reports results of exposure tests of polyvinyl acetate emulsion paints (Seidel and Beardsley). Specifically, their formulations were based on "Elvacet" 1423 and 81-900 (Du Pont). The finished paint was applied directly to bare wood and over various types of primers; 5,000 tests on wood, using about 1,000 formulations, were made. While the authors point out that more work (particularly to develop water-thinned primer for new wood) is underway, they see a bright future for exterior polyvinyl acetate emulsions (i.e., from 2,000,000 gallons in 1960 to 25,000,000 gallons in 1965).[4]

The fifth paper (Allyn) deals with acrylic emulsion paint for wood. Like the other articles in this issue of PAINT AND VARNISH PRODUCTION, Allyn's work is based on practical tests carried out over a period of years. His paper reviews the advantages of this type of emulsion paint, some formulation variables, and application conditions. He presents several formulas, and points out, in conclusion, that it is necessary to apply an oil primer to bare wood surfaces or heavily chalked surfaces in avoiding cracking and peeling in the use of the emulsions; nevertheless they possess solid advantages.[5]

In the same issue, Lalk describes an all latex-primer-topcoat system for wood. Specifically, this is Dow Latex 2647 (The Dow Chemical Co.), formulated especially for use in wood paints. Among advantages adduced for the system are its excellent adhesion, good weatherability and moisture resistance. Lalk discusses latex primers made with the Dow latex. He emphasizes that formulations of these exterior topcoat systems, using the Dow product, are established and conventional.[6]

Following this paper, Melvin discusses fine particle size emulsion for exterior paint. The aromatic solvent-modified polyvinyl acetate emulsion described by him is said to show marked adhesion to chalky surfaces.[7]

In the same series, Gordon devotes a paper to the durability of exterior latices. His article stresses the fact that, with synthetic polymer latices, the initial film properties depend on the nature of the polymer forming the solid portion of the latex. His article is an evaluation of tests made by Monsanto Chemical Co. over a period of years; he discusses laboratory data for moisture vapor transmission, and correlates these data with panel tests.[8]

An article following that of Gordon deals with exterior emulsion paints for wood (Feld). This is a review of properties, formulation, and application techniques. Once more, basing his conclusions on practical tests, the author concludes that emulsion house paints give excellent performance on exterior wood surfaces; for optimum service on unpainted wood, a suitable oil or alkyd should be used as primer.[9]

In Paint Manufacture, McLean reviews some of the recent literature on emulsion paints.[9a]

Results of a comparative study of PVA, copolymer and acrylic emulsion paints are reported by Safe. Properties such as exterior durability, pigment binding power and humidity resistance were tested. The author shows that each of the four types of resin emulsion studied confers its own specific characteristic on paints incorporating it. He summarizes the advantages and disadvantages of each type (e.g. standard PVA, fine particle size PVA, copolymer, and acrylic).[9b]

Tremain considers some commercial factors in the use of water-thinned paints. His article discusses the merits and disadvantages of emulsion and solution systems, and compares finishes made from them with conventional solvent-based paints on a cost basis. Tremain's paper emphasizes the advantages of flow coating for the industrial application of the water-based finishes.[9c]

The August, 1960 issue of PAINT AND VARNISH PRODUCTION carries a progress report on water-type industrial paints (Drubel and Walsh). Discussed here are binders, primer surfaces, topcoats, and chassis primers.[9d]

The flow properties of emulsion paints are the subject of a paper by Grimshaw and Pateman. In making their tests, the authors assumed these properties to be affected by a) the rheological properties of the paint when subjected to high shear forces during bursh-ing and after completion of brushing; b) the rate of loss of water from the paint by absorption into the substrate; and c) rate of water loss by evaporation. They developed simple laboratory procedures for determining each of these factors, and concluded that, with conventional emulsion paints, effect of evaporation rate on flow properties can be ignored. On non-porous substrates, rheological properties will probably be the main factor in determining the flow properties; a colloid mill technique for studying this is described. On porous substrates, again, rheological properties are important, as well as degree of penetration; these may be studied via colloid milling and filter paper tests detailed in Grimshaw's and Pateman's work. The filter paper

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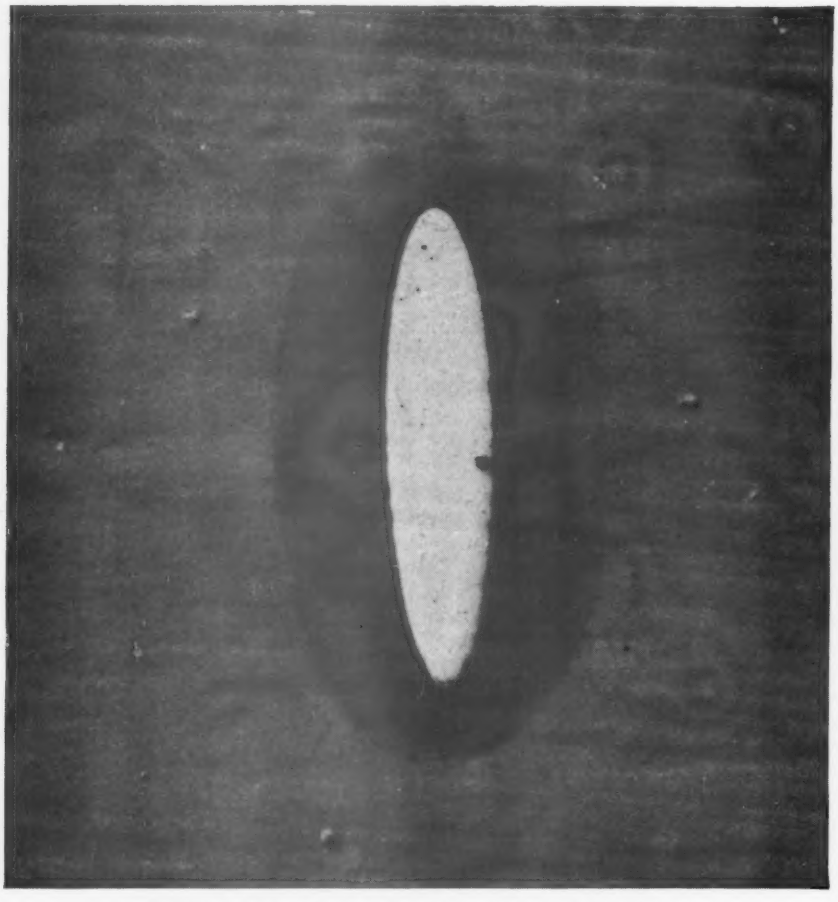

Modifying oil exudes from this drop of latex paint, soaking into the old surface chalk to form a sound paint base.

After 2 years' exposure, this Dow Latex 2647 topcoat shows no peeling or film failure over chalked oil paint.

This oil ring shows why LATEX 2647 PAINTS retain adhesion even over oil-paint chalk!

Exterior repaint finishes made from Dow Latex 2647 retain excellent adhesion and film integrity—even over *heavily* chalked oil paint—after modification with stirred-in oil.

A small quantity of linseed oil previously stirred into the paint is exuded as the Dow Latex 2647 vehicle dries. The oil is forced into the surface chalk, wets it out, and forms a sound, durable bond between the repaint finish and the weathered substrate beneath. The resulting long-term adhesion is outstanding.

Though this stir-in-oil technique is not new, it works exceptionally well with paints made from Dow Latex 2647. The modifying oil (with added drier and preservative) can be added either by the paint manufacturer—as a component of the finish—or by the painter just prior to application. On standing, the oil will cream out eventually, but can be easily redispersed by hand stirring.

Dow Latex 2647 repaint finishes also have exceptional resistance to blistering, regardless of humidity or of moisture content of the substrate. The result is outstanding repaint durability plus latex's easy application and quick clean-up.

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SIDE BY SIDE

SINCE AUGUST, 1955

Shown above: Segments of National cedar test panel L 753. Two coats each paint. Exposed at 45° for accelerated weathering.

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tests may also be valuable in determining differences in dispersion of tinting pigments. The authors are of the opinion that the techniques they describe can be extended to further problems of emulsion paints.[9e]

A very detailed paper by Warson covers emulsion polymerization. After an historical review of some of the theories, including those of Harkins and of Smith and Ewart, Warson evaluates the work of a number of other researchers, concluding with a summary of existing theories.[9f]

A two-part series by Sumner deals in considerable detail with theoretical aspects of emulsions. The first part discusses energy relations at interfaces, adsorption and surface activity, interfacial films in emulsions, properties of interfacial monolayers, oil-soluble compounds, orientation and the "overfilm", types of emulsifying agent, the meaning of stability, micelle formation, and solubilization. Second part covers machines and their functions, the physics of emulsification, work with hydrocarbons, phase relations in emulsification, sedimentation, the kinetic theory of Lawrence, flocculation, rheological properties, viscosity, inversion of emulsions, influence of electrolytes, "self-emulsifiable" systems, breaking of emulsions, and so forth. The articles offer not only a careful evaluation of past work but trenchant criticism of current theory.[9g]

Isophthalic resin emulsions are the subject of a paper by Martin. He deals with problems of formulation, and cites some of the advantages of this type of emulsion: they show promise for use in exterior interior gloss floor and porch enamels.[9h]

A paper by Scholl reviews recent developments in finishes based on water dispersed paint systems. His article covers paint formulations for concrete floors, semi-gloss and gloss interior paints, roof paints, fire retardant paints, and paints for exterior masonry and wood surfaces. Scholl emphasizes that emulsion vehicles have limited application, and that one vehicle alone, or one single type, cannot produce every type of finish; the limits of each vehicle, from the point of view of properties and formulation, must be recognized.[10]

Also in PAINT AND VARNISH PRODUCTION (June, 1960) Patton discusses the bonding of exterior latex house paints to chalky wood surfaces. According to this author, three primary factors determine effectiveness of an additive binder in securing adhesion of an emulsion paint to chalky surfaces; adequacy, penetration, and dry time of the binder. Using seven national brands of paint, Patton devised a series of tests which confirmed these theoretical points.[11]

In a general way, Riese deals with the formulation of plastic emulsion paints. He discusses pigmentation, film-forming properties, prevention of foams, incorporation of fungicides, leveling agents, buffers, antifreeze compounds, and thickening agents in polymer emulsions on the basis of styrene-butadiene copolymers, acrylic acetate copolymers, and vinyl acetate homo- and copolymers.[12]

The influence of wet-ground mica on acrylic latex exterior house paints is subject of a paper by Kronstein and others. Using wet-ground 225-mesh mica in acrylic latex paint, the authors showed excellent results in water vapor sealing properties, gloss retention, color retention, weatherometer exposure tests, and film density in light transmission. Their article includes a data sheet of physical and chemical properties, formulation processes, and a table of best performance of wet-ground mica on acrylic latex films.[13]

Talet reviews the properties of acrylic copolymer resins, and their use in emulsion paints, as well as in solvent paints, alone and in combination with thermosetting resins.[14]

A paper by Barole reports an investigation of the possibility of predicting the behavior of a styrene-butadiene latex paint without actually preparing the paint. Foam and mechanical resistance of latices were measured, as was wetting capacity. Although certain properties cannot be determined without converting the latex into a paint, preliminary measurements on the latex itself facilitate the exploitation of its particular properties and the selection of the best formulation.[15]

Sastry and Aggerwal discuss emulsion-paint vehicles prepared from oleoresinous varnishes with various emulsifying agents; peanut protein was found to be a satisfactory substitute for casein.[16]

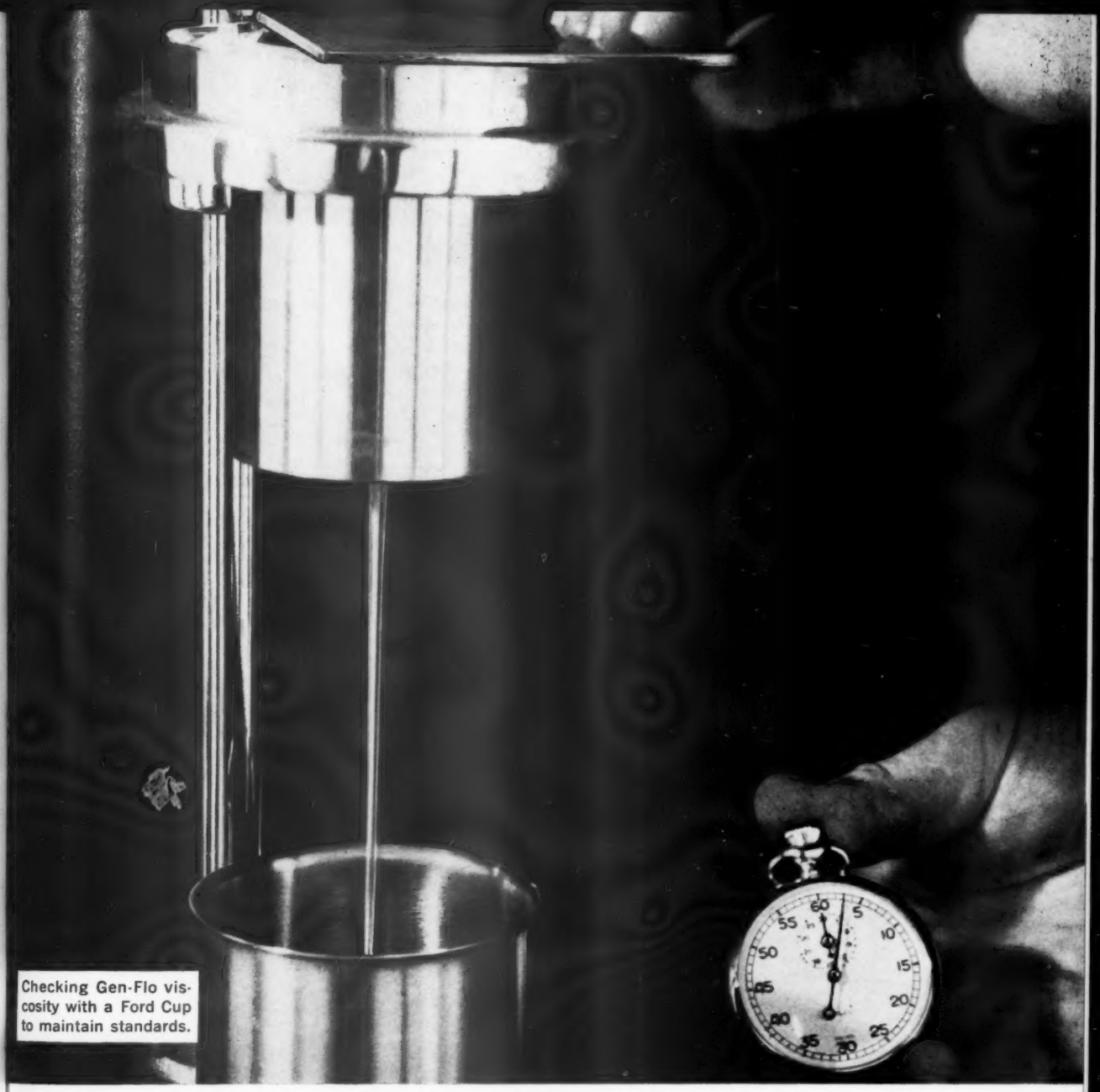
Le Besnerais discusses emulsions of vinyl copolymers for paints. He emphasizes that emulsions of copolymers of vinyl acetate with monomeric plasticizers (such as acrylic esters, vinyl stearate, chloroprene and butyl fumarate) broaden the field for emulsion paints. He notes that the covalent bond uniting the plasticizer with the vinyl chain is directly or indirectly responsible for a number of properties: lack of plasticizer migration, excellent washability of the paint film, gel resistance, film formation at low temperature, and the binding power of the emulsions.[17]

In the same Congress (see Bibliography), Rodeyns read a paper dealwith the rheological properties of poly(vinyl acetate) dispersion coatings. Plasticized and unplasticized resins, as well as binders and paints prepared from them, were examined with a viscometer. The latices were found to be liquids of the pseudoplastic type, with low or zero yield value and with no appreciable thixotropy. The rheological behavior of the latex was observed to have very little influence on the paint prepared from it; the rheology of the latter is determined by the nature and amount of protective colloid, the addition of pigments, and effect of pigment dispersion. The author ventures some discussion of the correlation between the rheological properties and certain characteristics of paint: flow, leveling, ease of application.[18]

Clark and Kitchen discuss the application of wood fat in emulsion paints; their paper reviews its effects on dispersion, brushability, permeability toward water, and resistance to scrubbing.[19]

Water-Soluble Coatings

Discussing an anti-corrosive water-soluble paint for metal surfaces, especially new galvanized steel, Frank reviews the difficulties encountered in preparing and decorating such steel surfaces, and advocates use of an oil-free polyacrylic dispersion paint, formulated



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with a pigment-binder ratio that assures durability. The new paint contains zinc chromate to inhibit corrosion. The author describes tests with various formulations, and recommends a particular formula and procedure as guides for further individual developments. The oil-free paint suitable for one-coat application over new untreated, or old unpainted, galvanized steel, contains a pigment mixture consisting of 325 parts natural red iron oxide, with 100 parts mica and 75 parts zinc chromate; this is prepared using 33.3 parts pigment dispersant and 150-165 parts water, in a ball mill geared to maximum grinding efficiency. Final preparation depends on amount of the batch. For application, a wide distemper brush, with long soft bristles, should be used. Salt-spray test showed that the paints had remarkable resistance to salt-laden atmosphere for more than 750 hours, and outlasted nearly all comparison paints. In prolonged weathering tests, the acrylic paints also showed excellent results. The paint may be used successfully as a primer under top coats, thus prolonging the life of such systems appreciably. Results of these tests were interpreted to indicate that water paints properly prepared can be satisfactorily applied to metal surfaces.[20]

Richard and Murray devote a paper to water-thinned semi-gloss enamels containing tung oil resins. In their work, a polyvinyl acetate copolymer emulsion was modified by the addition of an alkyd or epoxy ester emulsion—20% of the vehicle solids. Six test enamels were prepared, and on these gloss, hardness, abrasion resistance, color retention, adhesion and scrub resistance were compared. Their results indicated that a tung-oil alkyd ester modified enamel was superior in gloss, hardness, adhesion, abrasion, and scrub resistance; the epoxy modified enamels were superior in color retention.[21]

The subject of phenolic and alkyd media for water-thinnable stoving paints is dealt with by Berry. He discusses the paint formulation, control of pH, selection of pigments, manufacturing methods, pigment volume concentration, paint application methods, and uses.[22]

A very recent paper discusses a new approach to hiding power in latex paints (Browning). Dealing specifically with new extender pigments (the "Zeolex" series; J. M. Huber Corp.), in combination with TiO_2, Browning produced higher hiding power than that obtained on a purely additive basis. His paper includes several formulas.[23]

In a Russian periodical, Zabotin and others deal with the continuous polymerization of methyl acrylate in emulsion; they describe the use of a reactor adapted from the type originally developed by Dunlop and Reese (*Ind. & Eng. Chem.* 40, 1948, 654), for vinyl chloride polymerization. Using technical-grade methyl acrylate, purified by washing in 5% NaOH solution and in water, the authors used these substances for the reaction: methyl acrylate (93 parts by weight), hydroquinone (0.005), emulsifier (3), initiator (0.3), and water (300). Polymerization kinetics were studied, and the authors also investigated the rate of introducing emulsion into the reactor. When mixture is introduced too rapidly, lower polymer yield results, as well as a slightly higher degree of polymerization. In the continuous process, rate and degree of polymerization were lower than when polymerizing the same mixture non-continuously. A stable high-dispersion latex was obtained using sulfanol as emulsifier.[24]

Patents

Horning (to Allied Materials Corp.) patented a polysulfide polymer; this is a composition comprising at least about 10% of a polysulfide polymer and coal tar, said polymer containing recurring disulfide linkages (-S-S) and being a polyfunctional mercaptan.[25]

Kingston and Schwartz (The Glidden Co.) patented emulsion coating compositions from glyceride oils and vinyl monomers.[25a]

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"It is easy to apply, sets up and dries fast with no lap problem; has good body and flows easily. It is light in color and gives a uniform satin lustre."

"I varnished 390 square feet of floor, with a 5" brush, in just 40 minutes. Five hours after application prospective buyers were walking on this same floor. It's much tougher than any floor finish I have ever used . . . in 29 years I have never used anything as good."

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DRYING OILS and DERIVATIVES

ACCORDING to figures released from the U.S.D.A., the flax crop and soybean crop for 1960 was estimated at some 30.5 million bushels and 562 million bushels respectively. In the case of flaxseed, this increased crop yield was most gratifying since the hot, dry weather of late July and early August had caused some anxiety in the heavy flax area of North Dakota. From the standpoint of domestic consumption of linseed oil, this flax crop is sufficient to satisfy domestic oil needs.

Turning to soybean, we find that 562 million bushels represents the second largest crop on record. While soybeans have seen a spectacular production growth in the past 15 years, total production has levelled off during the past three years. Despite this leveling, the consumption trends of oil and meal have continued upward, and soybean production must again find ways and means of increasing. The U.S.D.A. estimates a carry over of approximately 30 million bushels. This added to their crop estimate provides a supply picture of 590 million bushels.

Production of tall oil fatty acids and tall oil rosin has grown from under 10 million pounds each in 1950 to 150 million pounds of tall oil fatty acids and 200 million pounds of tall oil rosin in 1959.

In 1961 the fractionating capacity is expected to increase to one billion pounds. This will assure a plentiful supply of tall oil fatty acids, distilled tall oil, and acid refined tall oil.

With the acute shortage of rosin of all forms, greater interest is being displayed for high rosin content distilled and acid refined tall oil.

In the way of new developments, the U.S.D.A.'s utilization research laboratory in Peoria reported some progress in the search for linseed emulsion paints. The paints were prepared to test emulsions of linseed oil and water; but during the evaluation of the emulsion, it was observed that many of the test paints have desirable characteristics of both resin-emulsion and conventional, linseed-oil exterior paints.

These paints resist running water within 15 minutes after they are appplied, and they surface dry sufficiently to permit repainting within a half hour. The paint can be washed from brushes and rollers with water. Other features include good adhesion to chalky surfaces, good hiding, good flow and do not show lap marks when applied.

Through the development of specialized emulsifiers, it was possible to produce paints (containing zinc oxide) that remained stable for a long period of time.

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General

A detailed article by Helme and others reviews ten years of research in the field of oil binders for paints, pigments and varnishes. Their paper covers fundamental and applied research carried out in that period.[1]

In another French journal, the same author (and others) discuss the mechanism of drying; they deal with the transformation of triglyceride into solid films. In the oxidative process, they distinguish three stages: the formation of hydroperoxides; the decomposition of hydroperoxides with formation of secondary products of oxidation; and the decomposition of these latter into polymers and products of splitting. Although they conclude that the autoxidation phenomena are similar for *cis* and *trans* esters, the *trans* esters appear to autoxidize less rapidly. The phenomena, moreover, take place far more rapidly under ultraviolet and in the dark.[2]

Three articles in a Russian journal deal with various phases of drying oil technology. The first of these is a paper by Zhirov, which reports methods of improving the quality of natural linseed oil. The highest protective properties and mechanical strength in film were observed in polymerized paint after phosphatides were removed. The stability of the paint increases with an increase of viscosity of the oils and their content of lead drying agent. The lowest tendency to gelling was found in polymerized paint oil; the highest in oil hydroxypolymerized and then oxidized to the higher viscosity. The second paper (Varlamov and others) deals with the effect of the degree of oxidation of oils on the quality of paint oils. This paper itemizes the physical and chemical indexes and film-forming properties of sunflower oils, condensed under different conditions to approximately the same viscosity; the rate of condensation increased with the temperature and quantity of air in the presence of a catalyst. Third paper (Bodyazhina) covers atmospheric stability of coatings made from synthetic and natural paint oils. Glyphthalic and pentolic drying oils made from semi-drying oils and pentaphthalic drying oils possess high atmospheric stability. Pentolic drying oils made from the more unsaturated fraction of acids from cottonseed and natural linseed oil made by high-temperature boiling should also be good drying oils.[2a]

New aspects of the chemistry of drying oils are subject of a paper by Petit. He discusses methods to improve hardness, gloss, resistance to yellowing and resistance to chemicals; attempts to modify rheological conditions to suit particular applications are described. Isomerization, Diels-Alder reactions, modification with styrene, esterification of fatty acid with polyfunctional alcohols; Claisen condensation of esters, followed by alkaline hydrolysis; formation of new drying oils by hydroxylation, followed by dehydration—all of these subjects are covered. New approaches to dehydration of castor oil are cited. Analytical procedures and instruments are reviewed.[2b]

Continuing a long series on reactions of unsaturated fatty alcohols. Gast and others write on polymers from polyunsaturated fatty vinyl ethers and certain cross-linking monomers. Their study included conjugated soybean, conjugated linseed and nonconjugated linseed vinyl ethers; these were polymerized with varying amounts of vinyl ethers containing reactive groups capable of cross-lingage during polymerization or subsequent film formation. The film properties of the polymers were investigated in relation to several variables. It is concluded that films from copolymers and terpolymers prepared with cross-linking monomers were generally harder, and had more alkali resistance, than films from polymers not containing these monomers.[2c]

Mills and Hammond cover recent advances in the chemistry and technology of fatty acid condensation products: chemistry, varnish making studies, compatability tests, film-forming properties are covered in a survey of chemical and technological advances.[2d]

Redknap devotes a paper to the subject of the reactions of drying oils with hydrocarbons, with particular reference to the influence on the film-forming properties and film performance of the constitution of the modified oils. Redknap's article deals with styrene, vinyl toluene, and cyclopentadiene; he points out specifically the differences between the last of these systems and the first two.[3]

A technical discussion by Kronstein deals with the preparation of stable dispersions of oil gels. The dispersions were made from polymer oil silids in organic media containing some of the original monomer fluid oil, in which the polymer solids are insoluble. Heating of the gel solids or their intermediate swelling products with metal soaps apparently released attractive forces between the molecules or particles, and resulted in a very fine dispersion, as well as in stabilization of the particles from reaggregation or polymerization in the suspension. X-ray diffraction tests indicated no basic molecular change of the dispersed gel matter.[4]

Von Mikusch, discussing the chemistry of the Unsapol condensation, reports an investigation of the boric-acid catalyzed condensation of fatty acids to drying oils, using model experiments with short-chain saturated anhydrides.[5]

In the same area, Lowa deals with the utilization of these condensation products in coatings.[6]

An article by Bisschop discusses copolymerization of natural oils by cyclopentadiene.[7]

Effects of light on the autoxidation of drying oils are discussed in a paper by Kaufmann and Vogelmann.[8]

In an Argentine journal, Rascio and Bruzzoni deal with the influence of white pigments on the quality and durability of oil paints. The first part of their study considers drying oils as binders. They found that white paints of linseed oil of more than 12 month durability in weather require the use of zinc oxide or titanium dioxide as pigment, of which 30% may be baryte. White lead and lithopone are good only for interior use. Polymerized linseed oil was not better under the test conditions; a polymerized mixture of 80% linseed oil and 20% tall oil, however, showed improvement.[9]

In *Farbenchemiker*, Kaufmann and Gruber deal with copolymerization in the field of surface coating materials. Their article describes

the reaction of drying oils with cyclopentadiene; methods of production, and reaction mechanism are considered in detail.[10]

Patents

A method of stabilizing the viscosity of oxidized synthetic drying oil was patented by McKay and Gleason (Esso Research and Development). The synthetic drying oil was prepared by copolymerization of a diolefin with a vinyl aromatic hydrocarbon, followed by oxidation to improve its pigment wetting and curing rate; the mixture is kept from gelling by addition of a di-*tert*-amyl hydrocarbon.[11]

British patent 827,623 (Esso Research and Engineering) deals with liquid copolymers of butadiene and styrene for use as drying oils.[12]

A British patent (Esso Research and Engineering Co.) covers preparation of drying oils by oxidation of copolymers of conjugated dienes.[13]

A German patent issued to von Osten and Pilinszky deals with a method of improving the drying characteristics of fatty drying oils. Organic nitrogen compounds are added, either before or after incorporation of metallic derivatives. Phenylhydrazine and/or its derivatives are suitable. These are readily soluble in drying oils and their derivatives.[14]

Another German patent (Erbe; Farbwerke Hoechst) covers a procedure for accelerating the molecular growth of drying oils using unsaturated organic compounds.[15]

Hauck and Hecker-Over patented oil-modified copolymers of drying oils and/or oil-modified resins with styrene.[16]

A German patent covers drying oil varnishes (Beacham; Titanges. m. b. H.); the varnishes are obtained from oils with conjugated double bonds (oiticica and/or dehydrated castor oil) and oil-soluble resins such as phenolic, alkyd, ester. These give smooth and elastic coatings.[17]

Procedures for increasing the solubility of metal-containing drying oils and increasing the stability of their solutions are subject of a German patent (Reisener; Borchers Gebr. Akt.-Ges.). Organic acids (such as alpha-ethylhexanoic acid or alpha-ethylhexenoic acid) are added to a metal-containing drying substance.[18]

Paints containing drying oils with conjugated double bonds are covered in a German patent (Erbe; Farbwerke Hoechst).[19]

A Japanese patent issued to Fujita and Uike (Mitsubishi Shipbuilding Co.) deals with the acceleration of drying and hardening of drying oils. A drying oil, composed mainly of glyceride of eleostearic acid or its mixture with another drying oil, is treated with a metal-containing drying agent and an oxide. Thus, tung oil is treated with cobalt naphthenate and an organic peroxide.[20]

Another Japanese patent to Sugiyama and Makuzen; East Asia Synthetic Chemical Industries) covers an improvement of the qualities of drying-oil films. The surface to be coated is undercoated with a synthetic resin containing CH_2:$CHCO_2Et$ prior to application of the drying oil or isomerized drying oil. A mixture of the synthetic resin and the drying oil may be used.[21]

According to a Swedish patent (Widegren; Svenska Oljeslageri Aktiebolaget), drying oils for paints containing organometallic compounds or metal salts of organic acids are prepared by treating the solution with complexing agents. For example, manganese octoate in heptane containing 1% Mn was treated with $EtNO_2$ or blown with N_2O or CO_2. The resulting drier was then added to linseed oil to give a Mn content of 0.01%, and the oil was then preoxidized by means of an internal peroxide or by blowing with air or oxygen. Treatment gave higher activity in use and greater stability in storage.[22]

Castor Oil

A kinetic study on the autoxidation of castor oil is the subject of a paper by Morgner. The author measured characteristic values at various stages of oxidation, and concluded that the processes involved are of a chemical nature.[23]

A paper by Drimus and Schuster deals with the possibility of replacing tall oil and linseed oil with castor oil in varnishes. The authors found that with respect to breakthrough voltage and durability, insulating varnishes prepared from castor oil are superior to those prepared from linseed or tall oil.[24]

Helme devotes a paper to hydrogenated castor oil. The alkyds prepared from this are equivalent in properties to alkyds made from coconut oil or lauric acid. Esterification with *tris*hydroxymethylpropane improves the properties markedly, particularly the flexibility and adherence, without harming the hardness. All of the alkyds have an increased alkali resistance and resistance to yellowing.[25]

Linseed Oil

Berry and Mueller report results of a study of oxidation of linseed oil containing cobalt, manganese and lead naphthalate, singly and in combination, and exposed to pure oxygen under lights of various color. The induction period of oxidation was found to be greatly influenced by the color of light and the metal used as drying catalyst, with cobalt, manganese and lead active in that order, and blue light the most active in every case (followed by white).[26]

Schiemann et al cover sulfurized oils; specifically the sulfurization of linseed oil with S_2Cl_2 and sulfur. They note that sulfurization with sulfur gives unsatisfactory results; but sulfur dissolved in benzene or aromatic hydrocarbons, applied at 130-180°C. with addition of vulcanization promoters, yields satisfactory results.[27]

The January, 1961, issue of PAINT AND VARNISH PRODUCTION reviews progress in the search for linseed emulsion paints recently carried out at the Department of Agriculture's Peoria research laboratory. The paints were prepared to test emulsions of linseed oil and water; but during the evaluation of the emulsion, it was observed that many of the test paints have desirable characteristics of both resin-emulsion and conventional, linseed-oil exterior paints. Properties of the paints are discussed: good washability, fast drying time, good adhesion to chalky surfaces, good hiding, etc. Experiments with zinc oxide are noted; it was found that this oxide tends to invert paints to water oil emulsions. New stabilized emulsifiers, however, helped production of stabler paints. Work done with safflower oils is cited.[28]

Two types of acidity in thermally

polymerized linseed oil are noted by Petit. He reports further that the neutralization equivalent is higher for polymerized than for unpolymerized oil. Fatty acids are produced by pyrolysis of the glycerol esters in the oil; removal of these acids by washing with alcohol leaves an acidic residue which contains a mixture of carboxylated polymers, the second source of acidity.[29]

Boelhouwer and others describe an investigation of the polymerization of linseed oil in an electric discharge. The increase in viscosity effected by the action of glow discharges—in a hydrogen or nitrogen atmosphere at low pressure—upon mineral and fatty oils has been known and utilized commercially for many years; for example, in the preparation of high-grade lubricating oils. For their recent work, Boelhouwer and his coworkers employed a "Voltol" reactor, and subjected the linseed oil to electrical discharges in an H atmosphere at a pressure of 8 cm Hg and a temperature of 70°C. Considerable polymerization took place, and analysis showed that the polymerization product resulting differed absolutely from the product obtained thermally or catalytically. Thus, Voltolized linseed oils contain only small amounts of cyclic compounds, and their viscosity is relatively low. The actual mechanism of the Voltolization process is discussed, and the authors point out that the production of compounds of completely different chemical structure by their treatment of linseed and other drying oils offers interesting new fields of manufacture and application.[30]

An article by Balbi deals with the properties and characteristics of Italian cooked linseed oil.[31]

Patents

British patent 798, 351 (Richard Nilsson Aktiebolag) covers a procedure whereby the drying time of linseed oil and other natural drying or nondrying oils is decreased to 1/5 or 1/6 of usual time by the addition of synthetic oils prepared by condensation of fatty acids with organic aluminum compounds in enolic form, stirring at room or elevated temperature. Water and weather resistance of the oils is improved, and films made from them are said to repel fungi.[32]

Tall Oil

A review by Agnello and Barnes covers the development of the tall oil industry, now approaching the billion pound per year mark—perhaps by 1965. Their article discusses methods of production and refining, application of fatty acids, and the future course of the industry.[33]

Akiyama describes the physical and chemical properties of a film of an epoxy resin esterified with tall oil fatty acid and styrenated, and its use as a varnish; the optimum composition was that having a ratio of styrene (%) to fatty acid (%) 0.6-1.5 and styrene content 20-30%. The same author describes vinylation of esters of linseed oil fatty acid and dehydrated castor oil fatty acid; an epoxy resin was esterified with each of these, then vinylated with vinyl toluene.[34]

Tung Oil

A paper by Decossas and others deals with tung oil as a resin varnish vehicle. This considers some of the cost factors in employing tung oil as such a vehicle; the authors note that production of 50% solids tung oil resin varnish vehicle of 15- and 25-gallon oil lengths may range from $1.27 per gallon to $1.50 per gallon, depending on yearly production.[35]

Preparation of varnish and varnish type vehicles containing tung oil is also the subject of a paper by Eaves and others. The use of the oil in production of "gas-proof" varnishes and vehicles is discussed, the authors pointing out that solution of some of the problems of such use are very recent. They themselves undertook a series of tests to determine the utility of a formulation (patented in 1958) for large-scale production of the gas-proof tung oil varnish. They interpret their results as demonstrating conclusively that the formulation can be safely and easily processed to produce a low-cost varnish of good quality.[36]

An article by Chatfield evaluates two kinds of tung oil—that from Nyasa and that from China. In his work, phenolic resin varnishes prepared from each oil were tested. The Nyasa oil (*Aleurites montana*) varnish required a higher temperature or longer time of cooking. Film properties were generally the same as those of the same formulas made with the China tung oil.[37]

A paper by Mayerhoffer details the determination of the iodine number of tung oil and of mixtures with linseed oil.[38]

Miscellaneous Oils

The use of segregated pilchard oil to replace linseed oil in anticorrosive primers is discussed by Chatfield. Promising characteristics of the oil are noted in the finishes based on straight oils, alkyds and epoxide esters; the oil is "doubly interesting" when it is favorably competitive with linseed oil in price. A later article by the same author discusses the use of pilchard oil in alkyd resins.[39]

Fractionation of sardine oil modified by direct interesterification is dealt with by Diaz Roman. The end product was compared with linseed and soybean oil. The residue oil shows characteristics nearly as good as linseed oil as regards water-resistance, tack, and drying time. Color, however, is deficient; and it is suggested as a modification of other oils.[40]

The use of sunflower oil in the lacquer and varnish industry is discussed by Gerasimiv and Ruschev. Their work appears to have been done on Bulgarian oils; the iodine number of samples from 45 areas was tested. Varnishes containing not more than 20% of the sunflower oil have satisfactory properties.[41]

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By Arthur V. Tobolsky, *Princeton University*. Outlines and explains the important features of the mechanical behavior of polymers by relating such behavior to fundamental principles of molecular dynamics and molecular structure. The author's approach permits the reduction of complicated phenomena to easily understood generalizations. *1960. 331 pages. $14.50.*

PHYSICAL CHEMISTRY OF HIGH POLYMERS

By Maurice L. Huggins, *Kodak Research Laboratories, Rochester*. Intensively covers the whole field without neglecting molecular structures of synthetic and natural high polymers (including proteins). Emphasis is on principles and on the explanation of properties in terms of molecular structure. *1958. 175 pages. $6.50.**

COLLOIDAL DISPERSIONS

By the late Earl K. Fischer. Explains the theory behind the production of colloidal dispersions, and describes, in detail, the important methods of production, including the efficient operation of mills and dispersion equipment. *1950. 387 pages. $11.00.*

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By Robert W. Martin, *Shell Development Co., Emeryville, California*. Each major type of reaction of phenols with aldehydes and ketones is considered individually, and the available data are presented fully and systematically. *1956. 298 pages. $9.50.*

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MALEIC ANHYDRIDE DERIVATIVES

Reactions of the Double Bond

By Lawrence H. Flett *and* William H. Gardner, *Allied Chemical and Dye Corp*. Intended for industrial chemists confronted with the problem of finding suitable chemicals to solve specific problems. *1952. 269 pages. $8.00.*

THE TECHNOLOGY OF SOLVENTS AND PLASTICIZERS

By Arthur K. Doolittle, *Carbide and Carbon Chemicals Company*. A complete survey in one volume of the practical and theoretical aspects of all commercially available solvents and plasticizers. Provides the reader with a *scientific basis* for deciding on the appropriate compositions for specific purposes. *1954. 1056 pages. $22.50.*

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By Calvin E. Schildknecht, *Stevens Institute of Technology*. Emphasizes the practical chemistry and physics of polymerization and polymers, the basic inventions, the methods of synthesis, the advantages, and limitations of the products. *1952. 723 pages. $16.50.*

EXPERIMENTAL PLASTICS AND SYNTHETIC RESINS

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By F. D. Gunstone, *Ph.D., A.R.I.C.* Incorporating material from recent advanced monographs on this subject, this work is written on a distinctly higher level than that of the usually inadequate treatment this subject is given in organic chemistry text books. *1958. 161 pages. $6.00.*

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SOLVENTS and INTERMEDIATES

Solvents

WITH the exception of benzene, most solvents are in good supply. The benzene shortage which is now world-wide is expected to continue for several months. Meanwhile, refiners who are presently producing benzene have been looking at their existing aromatic facilities with the idea of maximizing their benzene output. In many cases this can be accomplished at the expense of toluene and xylene, both of which are in ample supply.

The benzene shortage has also created a new outlet for toluene in the recently announced hydrodealkylation plants where toluene is converted to benzene by removing the methyl group. This development could, in the future, cause an increase in the present low price of toluene and xylene.

A significant technological development was the announcement of the availability of two new high-boiling solvents. According to the manufacturer, both of these solvents not only combine the general superior properties of ketones and glyco ethers but can act as strong solvents for such dissimilar resins as acrylic, vinyl, epoxy, urethane and nitrocellulose. As a result they give the formulator a broader raw material base and thereby assure both uninterrupted supply and price stability.

Intermediates

THE current shortage of phthalic anhydride is expected to remain at least until the third quarter of this year.

With the curtailment of steel production, there is no immediate relief in sight for increased supplies of naphthalene. Thus, phthalic anhydride producers look to the petroleum industry as another source of naphthalene to help fill the gap caused by the slow-down in steel production. Estimates are that by the end of this year some 325 million pounds of petroleum naphthalene will be available, sufficient to produce some 260 million pounds of phthalic anhydride.

The phthalic anhydride shortage naturally has spurred many paint and vehicle manufacturers to look at isophthalic acid in alkyd formulation. In short-, medium-, and long-oil alkyds, isophthalic acid has shown some success. It is reported that isophthalic acid will produce alkyd coatings that dry faster, are more flexible and tougher and are more abrasion resistant than straight phthalic types. Presently, about 40% of the isophthalic volume goes into the manufacture of alkyd resins.

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properties of SC aromatic solvents

PRODUCT	Initial °F.	Dry °F.	Dry °C.	Flash Point °F. (Closed Cup)	Speed Evap. Min.	Kauri Butanol Value	Aniline Point °F.	Specific Gravity @ 60°F.	Lbs. Per Gal. @ 60°F.	Aromatic Equivalent Content
SC Solvent #1	211	240	116	30	2.5	86.4	+ 1	.8259	6.88	74%
SC Solvent #1-A	202	235	113	25	2.5	67	+48	.8003	6.66	52%
SC Solvent #2	270	308	153	81	14.0	80	— 2	.8418	7.01	76%
SC Solvent #2-B	277	370	188	81	21.5	75	+12	.8388	6.99	68%
SC Solvent #3	356	400	204	135	64.0	72	+24	.872	7.26	69%
SC Solvent #28	329	379	193	122	51.0	73	+14	.8597	7.16	74%
SC Solvent #100	321	351	177	115	21.0	93.2	—37	.8708	7.25	96%
SC Solvent #150	369	412*	211*	152	98.0	91.8	—26	.8899	7.41	96%
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Solvents

The September, 1960, issue of *Official Digest* is devoted very largely to a symposium covering late developments in solvents for coatings. The keynote address (Long) emphasizes some of the active functions of solvents in formulations—for example, he points out that polar solvents can and do exert considerable attractive influence on polar resins. His general introductory paper deals with hydrogen bonding, factors affecting exterior paints, materials, adhesion, factor analysis.[1]

Long's paper is followed by an article by Baggs—a study of variations in solvent properties of isomeric hydrocarbons; Baggs reviews earlier work on the effect of solvent power on viscosity of resin solutions, and goes on to discuss solvent-viscosity relationships of the xylene isomers.[2] Third article in the symposium (Barker) considers in detail the divergence between the specifications of solvents and their actual behavior in a particular paint system. Reporting analytical results, he contends that you cannot tell in advance how a given hydrocarbon solvent will perform (using today's specifications), and that the sole way to determine usefulness of a solvent for a specific resin is direct determination under practical conditions.[3]

In the same symposium, Reynolds and Gebhart discuss calculation of the evaporation rate of hydrocarbon solvents from ASTM distillation data. In a highly technical paper, they develop equations which allow calculation of the entire evaporation curve for both petroleum solvents and pure hydrocarbons within an error of ± 12% of experimental value.[4]

Following this paper, Bennett discusses new developments in nitroparaffin solvents, noting that these compounds differ markedly from competitive solvents, and pose special problems for the formulator. Bennett devotes considerable detail to a study of the Solubility Parameter concept of Burrell, and notes the evidence that this concept enables the formulator to predict solvent release characteristics of a solvent system from a given solids formulation.[5]

Next paper (Hovey) reviews the usefulness of glycol ethers in new and old film-forming compositions. Hovey points out that, while they are among the oldest solvents, yet they are still the newest group to be used in large scale production; no other group of solvents appears in a wider variety of formulas even in minor amounts. His paper discusses properties and applications, citing numerous formulations.[6]

Following Bennett, Scherzinger reports new techniques for measurement of solvent retention in furniture lacquer. The techniques he discusses are weight loss, hardness development, and gas liquid chromatography.[7]

Final paper in the symposium is by Cogan; his subject is solvents in water thinnable coatings.[8]

Discussing choice of solvents, Barakan points out that the growth of resin technology has been matched by the expansion of solvent technology, so that today the paint formulator has a long list of products at his disposable. Barakan reviews the desirable properties of solvents, and then, in some detail, covers various types of resins—from alkyd to epoxy and urethane—noting which are the preferred solvents for each system. He also discusses methods of application.[9]

A review article by Finn and Tatton deals with the functions of solvents in paints. Choice of solvent, mixtures of solvents, and mechanism of solution are discussed.[10]

Foucry proposes a new term, the "polystyrene index," said to resemble the Kauri butanol index but to yield different information and to have a wider application among solvents. In particular, it is said to permit the rapid analysis of mixtures of aliphatic and aromatic hydrocarbons.[11]

An article by Papariello and others deals with the chromatographic analysis of certain glycerides and esters of ethylene glycol and polyethylene glycol. The technique discussed is an application of the procedure of Ravin and others (JAOCS 34, 1957, 261). Two solvent systems were developed for Papariello's study: the first was a slight modification of Ravin's eluent system, which separated the components of two kinds of mixture (glyceryl esters and ethylene glycol esters); the second was used to separate polyethylene glycol ester systems. Esters of polyethylene glycols with average molecular weights of 300-600 were shown to give the same chromatogram.[12]

Three other papers dealing with the gas chromatographic analysis of solvents are cited in the bibliography.[13-15]

An article by Grosssteinbeck deals with the behavior of solvents and resins in an electrostatic field. The work he reports was undertaken in order to gain some insight into the behavior of varnishes and surface coatings applied by electrostatic coating. The author determined drop sizes and velocities and spraying angle over a range of potentials. He cites various electrical properties, and notes that the dielectric constant is directly proportional to the electrical conductivity; thus the determination of these two properties allows prediction of the behavior of lacquers and varnishes in an electrostatic field.[16]

Furan solvents for paints are discussed by Rozan and others. The solubility of twenty paint raw materials in 2-methylfuran, 2-methyltetrahydrofuran and tetrahydrofurfuryl alcohol was determined, and viscosities of 10% solutions of five lacquers in these were compared with lacquers dissolved in conventional solvents. It was found that the latter two compounds had acceptable paint-solvent properties.[17]

Purcell writes on the uses of 2-nitropropane solvent in protective coatings, pointing out that its properties must be completely understood if it is to be used advantageously in a paint formulation. A comparison with methyl isobutyl ketone and *n*-butyl ketone shows that 2-nitropropane has a higher flash point than either of these; this, together with its relatively high flammability offers advantages. Its solvency, too, properly utilized, can be helpful; it has been found to be an excellent solvent for most of the vinyl chloride copolymer resins and in solution vinyl formulations. Epoxy coatings are another type where 2-nitropropane is useful. Recently, the solvent has been used in polyurethane finishes and in acrylic lacquers. Purcell emphasizes that, in all of these cases, the special properties of

2-nitropropane must be exploited if formulation is to be fully successful. He concludes by noting that the solvent is valuable as a pigment-dispersing aid.[18]

Sevestre devoted a paper to the subject of ketonic solvents in the formulation of vinyl coatings. He discusses polyvinyl acetate-chlorides, polyvinyl chloride; their chemistry and formulation.[19]

In Paint Technology Fairtlough and Loible discuss technical aspects of high boiling high aromatic solvents. Their paper reports results obtained with Shellsol A (about 98% aromatic content) and Shellsol E (about 84% aromatic content); the epoxy resins used were Epikote resins. These results are compared with those obtained with xylene and toluene. Advantages are claimed in long oil alkyd enamels, chlorinated rubber systems, alkyd-amino stoving finishes and epoxy resin-based systems, and the use of the high aromatic solvents in other applications is suggested.[20]

Solvents for automotive enamels are considered by Reynolds and Griebel. The use, by the automotive industry, of high-melamine-resin content enamel for body finish, brought with it a number of problems. The authors discuss the effect of solvent properties on some imperfections of surface encountered with these new enamels: these imperfections included pinholing, floating, and low gloss.[21]

Watson discusses the problem of choosing the proper solvent for specialized types of acrylic lacquers suitable as motor car coatings; in particular he deals with the "difficult" resins—those that are generally less soluble and at the same time have the best film properties (for example, gloss and hardness). Tests made with Lucite 41 and 41, Acryloid A101, A 21 and B72, and with a wide range of solvents (from acetone to xylene) indicated that in general the lower ketones, esters and aromatic hydrocarbons are solvents for these resins, but aliphatic hydrocarbons are not. With certain exceptions, the lower glycol ethers are solvents; some alcohols are also. The author concludes that low viscosity (with no serious decrease of solids content) is required; this necessitates a high proportion of low-boiling true solvent, such as acetone, methyl ethyl ketone, or toluene. It promotes adequate build and avoids cobwebbing. Substantial amounts of high-boiling solvent are used to avoid pinholing and promote good flow.[22]

A paper by Barakan deals with solvents for decorative and industrial alkyd-based coatings. Discussed are aliphatic and aromatic hydrocarbons.[23]

A paper by Watson deals with the uses of high boiling paint solvents in nitrocellulose lacquers. The author points out that the incorporation of relatively small quantities of this type of solvent markedly alters the properties of nitrocellulose lacquers. He discusses tests which show that the solvents will generally improve flow, gloss and blush resistance, although they prolong drying time.[24]

Patents

United States patent 2944915 (Low and Reynolds; Shell Oil) covers odorless solvents from propylene tetramer.[25]

A British patent (Sharing; Imperial Chemical Industries Ltd.), deals with improved solvents using the high-boiling fraction of oxygenated compounds obtained by the oxo process. The products are said to improve brushability, leveling, and wet-edge time.[26]

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Intermediates

Acids and Anhydrides

A paper by Zarick reviews the application of isophthalic acid in polyester resins. Citing advantages in its use (better adhesion, higher impact strength, better alkali resistance, higher heat distortion, higher viscosity at higher styrene content, and higher flexural strength), Zarick then considers some of the problems encountered in its use, and how these are overcome in practice.[1]

Martin contributed a paper on isophthalic resin emulsions; he cites their application in a wide variety of formulations.[2]

Also in *American Paint Journal*, Weigand reviews the use of isophthalic acid in alkyd resins.[3]

In the *Official Digest* for November, 1960, a Subcommittee on Resins reports on the commercial production of isophthalic acid resins. The paper reviews the structural chemistry of the isomers of phthalic acid, and enumerates the physical and chemical properties of each. Factory production of experimental resins in 1,000 gallon resin kettle batches is covered; long alkyd resin, medium soya modified alkyd, and a short soya modified alkyd were produced.[4]

A paper in *American Paint Journal* deals with the production of water-soluble baking resins from trimellitic anhydride.[5]

Polyols

Polyether polyols in urethane coatings are considered in a paper by Damusis and others. These authors prepared one- and two-component urethane coatings by reacting a series of new polyether polyols with tolyene diisocyanate. The polyol series included simple and polymeric diols, triols, and tetraols. The article cites conditions of formulation, properties, and possible applications in considerable detail.[6]

The October, 1960, issue of *Paint Manufacture* carries some of the methods approved by the Surface Coating Synthetic Resin Manufacturers' Association and the British Plastics Federation for the analysis of pentaerythritol and of alkyd resins.[7]

The August, 1960, issue of PAINT AND VARNISH PRODUCTION includes an article by Powanda and others, dealing with trimethylolpropane alkyd resins. For economic reasons, an investigation was made of the preparation of trimethylolpropane tall oil fatty acid alkyd resins and the enamels made from these resins. A series of tables shows some of the properties of formulations of these types; the authors conclude that coatings based on these materials show excellent color and color retention, hardness, resistance to alkali and boiling water, and high impact resistance.[8]

In *American Paint Journal*, Kraft and others discuss pentaerythritol-aldehyde condensates in coatings. Basic chemistry, and formulation are reviewed here; the unusual properties of the resulting coatings are cited.[9]

Brandner and Birkmeier discuss the relative esterifiability of the primary and secondary hydroxyl groups of glycerol in a highly technical paper.[10] An article by Malyan reviews the use of glycerine in polyurethanes. Malyan deals with the chemistry and processes involved, concluding that "the glycerol modified and otherwise modified castor oils offer unusual opportunities, and extension into the polyester field on a larger scale seems likely."[11]

Miscellaneous

Staddon deals with the incorporation of paraformaldehyde in alkyd resins, this compound being used to reduce the polyol functionality of the system. The technique enables oil-modified pentaerythritol alkyds to be made at shorter oil lengths. Properties of the final alkyds did not differ greatly from those of more conventional alkyd resins; but the procedure discussed here is thought to be of potential interest.[12]

The preparation of terephthalic acid by single-stage oxidation is subject of a paper by Brill.[13]

Meshcheryakova and Ostroumova reviewed the literature dealing with alkylphenolics for the paint and varnish industry. Chemical and reaction mechanism are discussed. The paper mentions that research in new alkyphenols is planned in the USSR to parallel the development of the Soviet of petrochemical industry[14]

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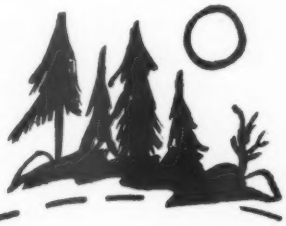

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PIGMENTS

THERE are ample supplies of all pigments, both organic and inorganic at the present time. However, in view of the very tight situation of phthalic anhydride, beta naphthol and other naphthalene derivatives, pigments based on these intermediates may cause some difficulty within the next few months, but no severe shortage is in the offing.

Last year saw some new developments in the pigment field. Among these was a new quinacridone pigment. This pigment is said to possess a clean brilliant red-violet hue and can be used to produce varied color effects such as fiery red shades with molybdate orange, and clean pastels with titanium dioxide. With non-leafing aluminum, it produces bright iridescent red-violet shades, and brilliant yellow toned iridescent maroon colors with aluminum and gold paste or other yellow and orange pigments.

Of particular interest was the availability of low opacity iron oxides (red and yellow) which are light-fast, and capable of screening ultra violet light. In addition, these pigments are claimed to be non-toxic, acid-alkali stable, readily dispersed, and non-bleeding.

A pigment for halogenated paints requiring flame resistance was introduced last year. This pigment is composed of an inert silica core of low specific gravity, and has a surface layer of antimony oxide fused to the core. According to the manufacturer, this pigment compares favorably with antimony oxide in flame-proofing efficiencies.

The use of molybdates as corrosion-resisting pigments was discussed by H. O. Schoen of Battelle Memorial Institute at the last annual meeting of the Federation of Societies for Paint Technology in Chicago.

Preliminary investigation shows that these pigments are generally equal or out perform red lead as corrosion inhibitive pigments. The two big advantages are non-toxicity and white color. Because of their non-toxic properties, molybdates can be used as primers for food processing machinery, food storage containers, water tanks, etc. Since these pigments are white, they could be used in one-coat paints for metal surfaces that are both corrosion-resistant and decorative.

One of the interesting properties of these molybdate pigments is that they are neither very soluble nor very insoluble in water. This is important, since in order that inhibiting pigments function well, they should have intermediate solubility. Three molybdate pigments were studied: calcium molybdate, zinc molybdate, and zinc polymolybdate.

For more information circle No. 42—last page

General

An article in the *Journal of the Oil and Colour Chemists Association* deals with trends in organic pigments. The main types are reviewed, along with the uses for which they are suitable. The author (Stead) classifies organic pigments as pigmentary dyestuffs, toners, lakes, metal complexes, and miscellaneous (alkali blues). He discusses each of these types in some detail, including their chemistry, and concludes with a forecast of future developments.[1]

Haberfield considers the formulation of "universal" tinting colors, useful in both latex and oil paints. He discusses pigments and vehicles, and reviews the characteristics of surfactants as emulsifiers. He concludes that only anionics and nonionics should be employed in formulation. Water-miscible solvents are taken to be particularly valuable in the dispersion in water of an oil miscible binder, and to make an emulsion with oil-soluble surfactants.[2]

In the French journal, *Peintures, Pigments, Vernis* Lenoir continued with a series on organic pigments. In the two references cited here he deals specifically with azo compounds of betanaphthol and of beta-hydroxynaphthoic acid.[3]

A review by Plant covers the performance of colored pigments in present-day finishes.[4]

Payne discusses the relation of molecular structure and pigments to coating performance. He covers the main components of coatings, emphasizing characteristics related to these components. Molecular structure, the significance and function of primary and secondary bonds, and the relationship of molecular weight to performance are considered; the function of modifiers and how they influence the characteristics of coatings are explained. The mechanism of adhesion is reviewed.[5]

Bieneman and others detail a method for formulating stable pigmented coatings systems, based on polyurethane prepolymers. The authors classify polyurethane coatings as: one can stable polyurethane copolymers containing no free isocyanate groups which can be pigmented and applied by conventional methods; an isocyanate low-molecular weight polyol adduct containing free isocyanate groups and designed to be further reacted at time of application with relatively large amounts of hydroxyl bearing components such as vegetable oils, polyesters or polyglycols which can react as pigment carrier; and an isocyanate high molecular weight polyol prepolymer containing free isocyanate groups but designed to be crosslinked at time of application with relatively small amounts of catalysts and or moisture. The method they propose is concerned primarily with the third group. It is the authors' theory that the instability of many pigmented polyurethane prepolymer coatings systems may be caused not only by reaction with water, but also by reaction with other groups present as impurities.[6]

In a French trade paper, Biais and Herenguel discuss aluminum pigments in the paint and allied industries. Properties and applications are considered in detail.[7]

A paper by Paton and Williamson reports the performance of some azo pigments in Australia. Of the pigments they tested, the authors note that the simple azo Toluidine Red and Permanent Red R have sufficiently full shade color retention for use under New South Wales conditions, when formulated in an alkyd enamel. Permanent Red FRLL performs even better. On the other hand, Permanent Carmine FB is unsuitable for pigmentation of reduced, and possible full shade, decorative enamels.[8]

In a generally theoretically paper, Mill discusses the rheology of carbon black suspensions in media suitable for use in printing inks. The suspensions he examined were prepared by stirring the pigment into the oil, followed by passes—generally four—through a three-roll mill. A range of concentrations was studied, and most of the dispersions were of West Virginia carbon in mineral oils; however, in some instances Peerless Black in lithographic varnish was used. From a close study of shear rate and time of shear, the author concludes that two types of structure exist: one of these is weak but forms rapidly; the other is rigid and slow in formation. Comparing his results with those obtained in past work, Mill observes that, when freely milled, suspensions of carbon black behave as simple Bingham bodies, but that, with age, a structure develops which is progressively destroyed as shear rate goes up.[9]

The dispersion of carbon black is subject of a study by Low. In a three-part article, he covers first its applications, then the machinery for making dispersions with it.[10]

The functions of extender pigments in exterior vinyl emulsion paints are discussed by Liberti. His paper reports exposure results taken from test fences of National Starch and Chemical Corp., in New Jersey. Vinyl acetate copolymers with 50% PVC were tested under various conditions, as were the same copolymers with dual extender. Conclusions indicate that most of the commonly used extender pigments are suitable for use in exterior vinyl acetate paint systems.[11]

Titanium Pigments

A paper by Taylor deals with organic titanium compounds. The author reviews the properties of the main groups, and follows with a discussion of the use of various compounds in a wide variety of applications. He deals particularly with the use of these compounds in heat resistant paints, as adhesion promoters, and dispersing gels.[12]

Williams discusses micronization of titanium dioxide, emphasizing that fineness and uniformity of particle size are important if the pigment is to be readily and satisfactorily dispersible, and that both of these properties are given by micronization.[13]

Titanium dioxide is subject of a technical review article in *Peintures, Pigments, Vernis*. History, manufacture, properties, and application are discussed.[14]

A very detailed article by Davidson deals with whiting dispersions, particle packing, and surface adsorption.[15]

Zinc Pigments

Two papers deal with zinc pigments in house paints. The first of these (Adams), is concerned with the hiding power; from tests

made, the author concludes that the zinc pigment contributes from about 27% to as much as 46% of the hiding power of house paint.[16]

Second paper—really a symposium at the American Zinc Institute—deals with zinc pigments in exterior house paints. Introductory remarks by Pettigrew describe the activities of the Institute and its contribution to the trade. Following this is a panel discussion, by several experts in the field, of some of the problems in the use of these pigments, how they may best be formulated, and so forth.[17]

Lenz deals with the subject of zinc sulphide pigments in synthetic resin dispersions for exterior paints. His work is based upon practice carried out in West Germany; but the author notes that weathering tests performed in Haarlem confirm his observations, at least in some respects. In some detail, Dr. Lenz outlines a theory of film formation from the corresponding pigmented systems; this involves—among other things—the effect of Brownian motion.[18]

In *American Paint Journal* Crossley devotes a paper to "trends in zinc oxide." The author analyzes the consumption patterns for the oxide, in relation to population growth, with interesting results. Although he recognizes declining usage of the pigment, he ventures some optimism about its future.[19]

Articles in a number of foreign journals deal with pigments. The resistance of Phthalocyanine Blue to aromatic compounds is dealt with by Turk.[20] Lenz discusses zinc sulfide pigments in emulsion paints for outside use; he covers the mechanism of film-formation of emulsion paints, the relationship between chalking and adhering dirt, and the application of a special zinc sulfide pigment (Sachtodur-Elkadur).[21]

The performance of titanium dioxide pigments in a sand grinder is subject of a paper by Brownlie. In addition to the question of proper grinding charge, other factors must be considered if a sand grinder is used: rheological behavior and apparent initial viscosity of the mill-base, among others. Brownlie discusses these points, and concludes that modern titanium dioxide pigments lend themselves readily to sand grinding.[21a]

Determination of zinc and zinc oxide content in lithopone is subject of a paper by Schaller and Mihalovics.[22] Kindevater discusses the adsorption of polar organic compounds on lithopone and other white pigments; adsorption isotherms of amines and organic acids from toluene and water on lithopone, titanium dioxide, and zinc oxide were determined (Dintenfass technique). Polar group of the adsorbed compound has the greatest effect on degree of adsorption.[23] Grossmann writes of the weather-resistance of zinc sulfide; he notes that photolytic formation of soluble zinc sulfide is inversely proportional to the weather-resistance of lithopone paints. Exposure tests of various paint systems containing stable zinc sulfide confirm their superiority after four year weathering.[24] In a Japanese journal, Kato and others discuss chrome-tin pink[25] In *Paint Journal of Australia*, Ryan and Williamson review recent developments in chrome yellow.[26]

The *Official Digest* for October, 1960, carries a translation, from the Russian, of a paper on dispersion of pigments in highly viscous media. Original of the paper was by Alekseev; the translator is Fuerst.[27]

Patents

An Austrian patent (Klimits; Walter Marx & Co.), deals with

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powdered and easily dispersable in water.[28]

A British patent (to J. R. Geigy A.-G.) covers finely crystalline dioxazine pigments.[29]

British patent 830108 (Columbian Carbon Co.) deals with a pigmentary alpha-ferric oxide (red).[30] A phthalocyanine pigment is covered by British patent 824558 (Société Nouvelle de Chimie "Le-Pont-du-Risse").[31]

French patent 1175443 (Holbein; Fabriques de Produits Chimiques de Thann) deals with organophilic and hydrophilic pigments, based on titanium dioxide, for use in paints, emulsion paints, etc. They are prepared by combined treatment of the pigment with an "active substance", and a thin colorless film of hydrated metal oxide.[32]

French patent 1152128 (Orliac and Capdecomme; Centre Nationale de la Recherche Scientifique) is concerned with titanium oxide concentrations from bauxite red mud.[33]

German patent 1024184 (Wenk; Farbenfabriken Bayer A.-G.) deals with pigments prepared in the powdered state by addition of solutions of modified or unmodified and or hydrogenated rosin, or their metallic salts or esters to the aqueous solutions in which the pigments are to be formed, either by precipitation or by coupling reactions.[34]

Fischer patented pigments of the dioxazine series (Badische Anilin- & Sodafabrik A.-G.); chloroaniline is condensed with 1,4 - dialkoxy - 2 - amino - 5 - arylaminobenzenes in the presence of chloride-binding agents. The resulting blue pigments are described as "valuable".[35]

Beacham (Titanges. m. b. H.) patented fast-drying vinyls containing titantates.[36] Richmond and Durrant, in another German patent, covered an improvement of dispersability of titanium dioxide pigments; the pigments consist entirely or at least up to 15% of titanium dioxide and lithopone, $BaSO_4$ or $BaCO_3$; these are suspended in water in the presence of at least 0.1% (preferably 0.25-0.75%) of dispersing agent, such as sodium silicate, sodium tripolyphosphate, etc.[37] A further German patent (Gottlieb; E. I. Du-Pont de Nemours & Co.) deals with copper phthalocyanine pigments.[38]

Bergmann and others (Bergwerksverband Kohltechnik G. m. b. H.) patented pigments for lacquers and antirust paints; these are the reaction products of humic acids with alkaline earth and heavy-metal salts or hydroxides.[39]

Quite a number of American patents will be cited briefly here. Dempster and Nelson (National Lead Co.) covered rutile pigments dispersible in aqueous media; these were made from titanium dioxide calciner discharge containing 0.3-1% calculated as sulfoxides on a titanium dioxide weight basis, occluded, water-soluble metallic sulfates.[40] Subject of American patent 2930775 (Fordyce and others; Rohm & Haas Co.) is pigment pastes containing water-soluble diisobutylene-maleic anhydride copper salts as dispersing agents.[41] A red iron oxide pigment was patented by Ayers (C. K. Williams & Co.)[42] Bram and Vecchio patented tinting base compositions for coatings (Benjamin Moore & Co.).[43] Thornhill (Columbia-Southern-Chemical Corp.) covered silica pigments.[44] United States patent 2943948 (Allen; Columbia-Southern Chemical Corp.) deals with

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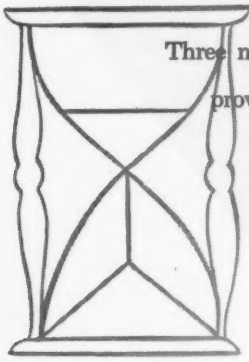

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colors

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finely divided, precipitated, white aluminum oxide-silicon oxide pigments in the form of flocs.[45] Katz and others (General Aniline & Film Corp.) patented acid pasting of crude copper polychlorophthalocyanine pigments.[46] Clark and Paul (W. P. Fuller & Co.) patented pigment concentrations for paints; in these phthalocyanine, soybean lecithin, wetting agent, and a mixed methyl ethyer of mono-, di-, and tripropylene glycol are used.[47] Jackson (E. I. DuPont de Nemours & Co.) patented crystal-stable, chlorine-containing copper phthalocyanines.[48]

United States patent 2927862 (Welch; Welco Mfg. Co., Inc.) deals with improved tinting agents prepared by mixing pigment, calcium carbonate and surface-tension depressant in a ribbon mixer.[49]

Russian patent 126970 (Kozlov) covers copper ammonium ferrocyanide pigments.[50]

Russian, Polish Developments

Kazmenko and Tabunchenko describe a simple and rapid method for determining the zinc oxide content in rutile. The procedure takes about two hours, and makes use of the sodium salt of anthranilic acid.[51]

In the same journal, Rozenfeld and others discuss the passivating properties of chromate pigments in lacquer coatings. Specifically, they point out that the presence of of such pigments in film-forming substances increases the anodic polarization of steel and duraluminum.[52]

Bronstein and Ivanova devote a paper to a method for the rapid determination of degree of pigment grinding; the technique is said to cut analysis time from about 24 hours to only 5-15 minutes.[53]

Frost, in the same Russian source, writes about the reactions of carbonyl-containing binders with pigments in thin films. His study deals with the conversion of a copolymer of styrene and maleic anhydride, esterified by butyl alcohol, into a three dimensional polymer, by the reaction of carboxyl groups with zinc oxide.[54]

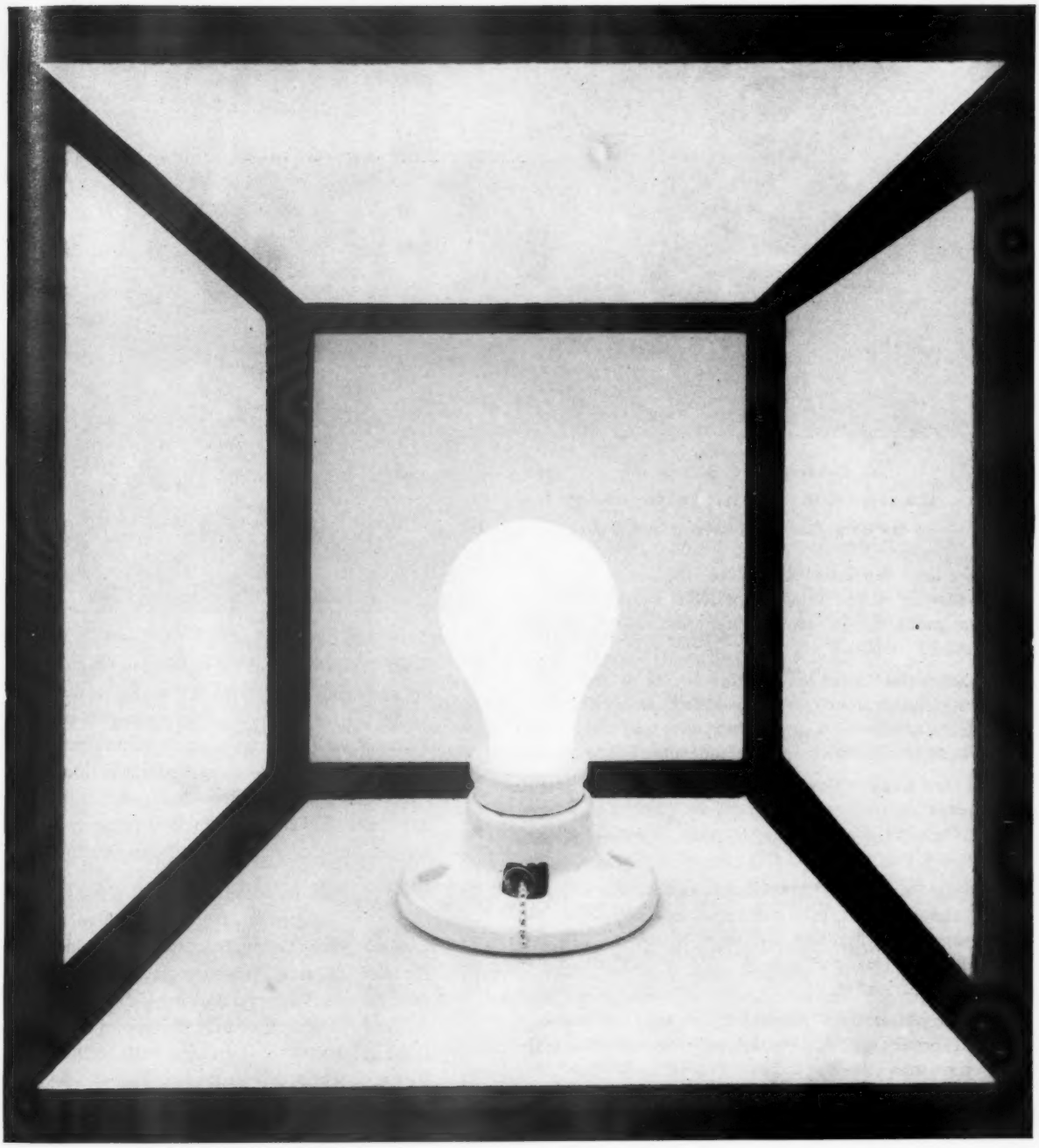
The latest five-year plan for Russian industry expects, among other things, an increase in pigment production of 260% over the period 1959-1965. Titanium pigment production will increase ten-fold.[55]

A paper by Alekseev deals with pigment dispersion in highly viscous media. This is a review of Western and Russian investigations in the areas of thin pigment dispersion in jet mills, in binders, treatment of highly viscous paint pastes, effect of dispersion additives on stability of nitrocellulose enamels and coatings, and includes some notes on the superiority of the nitrocellulose enamels and coatings, and the technology of manufacture of dry pressed pastes.[56]

Rehacek discusses the effect of some factors on the error in density determination of pigments, comparing the pycnometric, gravimetric and volumetric methods.[57]

The substitution of hydrogen peroxide solution by sodium hypochlorite in the preparation of ferric yellows is discussed by Krause and others. The technique they describe is said to have industrial applications.[58]

The Russian journal, *Lakokrasochnye Materiali i Ikh Primenenie* carries a brief outline of 1960 standardization plans for the U.S.S.R. Among products listed are pigments—as well as synthetic enamels for automobiles, epoxy enamels, paints and lacquer materials and other finished products, perchlorovinyl enamels, and analytical procedures.[59]



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DRIERS and ADDITIVES

AT the present time, the expected supply situation as it exists for driers, fungicides, bactericides, and general paint additives, appears satisfactory. Naphthenic acid has been noticeably tight within recent weeks, but not sufficiently severe to prevent the manufacture of naphthenate driers to meet the requirements of the paint industry.

The continuing growth of water-thinned paints is providing added stimulus for increased additive sales. Among those additives profiting by this trend are antifoaming agents, pigment wetting and dispersing agents, agents to prevent efflorescence, bactericides, emulsifying agents, etc.

The only area where the growth of water-thinned paints has hurt the additive picture has been in the field of driers. Practically, none of the interior water-thinned paints contain driers. Only those exterior paints that have an oil or alkyd modifier normally contain drier and even then it is usually only a small amount, since it is based on the amount of modifier used. On the other hand, there is some evidence to indicate that even in non-oil or alkyd modified water thinned paints, the use of water dispersible driers has speeded the rate at which these paints become washable. As a result, a new water dispersible drier industry seems to be forming.

In exterior oil and solvent based paints there is an increasing demand for solvent based phenyl mercurials due to the recent growth of blister resistant paints. Such paints are normally zinc-oxide free and these require much larger amounts of fungicides in order to protect them from excessive fungal attack.

Significant developments in the field of additives were noted during 1960. Of particular interest was a 100% active, nonionic emulsifying, designed for the preparation of oil based emulsion house paint primers and finish coats. This emulsifying agent is miscible in both oil and water and is soluble in water in all proportions. It is also stable in the presence of aqueous solutions of acids and alkalis.

The most recent contribution that silicone technology has made to the protective coatings field, is a new series of paint additives designed to increase efficiency of application as well as improving durability and appearance of coatings. These silicone additives are said to prevent floating, flooding, and silking in a wide variety of finishes, improve flow-out and leveling characteristics of lacquers and paints; reduces orange peel in spraying; reduce surface friction of coatings; and impart various texture effects in baking and air-drying finishes.

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Driers

Marwedel devotes a paper to the volumetric determination of alkaline earths and heavy metals in drier solutions. Magnesium, calcium, cobalt, zinc, manganese, copper and lead soap solutions are prepared by the addition of powdered oxalic acid; the precipitate is washed with hot alcohol-toluene on a filter crucible. Neutral salt is dissolved in 4 *N* sulfuric acid and the oxalic acid is treated with 0.1 *N* potassium permanganate. Blank titration based on alcohol-toluene insoluble oxalic acid is necessary as a correcting factor. Lead oxalate can be determined gravimetrically.[1]

McCourt and Tuberg discuss a rapid analytical technique for the quality control of the metal content of paint driers. Titrations with the disodium salt of ethylene diaminotetraacetic acid provide a general method for the analysis of lead, cobalt, manganese, zirconium, zinc and calcium. Only a small number of reagents is required, the apparatus used is simple, and the reagents stable.[2]

A paper by Canty and others deals with drier catalyst activity in organic coatings.[3]

Giesen reviews new developments in driers. His article considers the effect of the metal drier in the oxidation mechanism of drying oils with and without conjugated double bonds. Zirconium compounds as catalysts for metal driers are discussed in detail; the use of 0.1% zirconium, added as a complex—zirconium tetrastearate, for example—in a cobalt-lead drier system for alkyds is shown to be beneficial in reducing set-to touch and drying times.[4]

Patents

A British patent covers driers for coating compositions having a high metal content, low viscosity, and good color; these are formed from a mixture of naphthenic acids and Koch acids.[5]

German patent 1004750 (Kaufmann) covers driers prepared by treating mixtures of metals in waste products from the purification of zinc roasting residues—for example, with naphthoic acid.[6]

Aluminum Compounds

Weiss writes on the effect of aluminum compounds in paints and oil varnishes. Some of the advantages of drying oils incorporating aluminum compounds are cited and discussed; these include their easy thickening, fast drying, water-resistance, and certain antibacterial properties. The author notes that these advantages are transmitted to the surfaces prepared with the coatings. The drying oils Weiss describes are said to be replacing boiled linseed oil in paints, and may be used advantageously in varnishes, in the place of these oils and stand oils. Weiss further discusses, in particular, a modified use of Chinawood oil.[7]

The utilization of complex salts of aluminum is discussed by Clement and Petit. These authors studied the composition and properties of monosubstituted aluminum disalts, which were observed to solidify more easily than the hydroxylated disalts normally used. They are, however, more difficult to obtain in the pure state. For this and other reasons, the authors conclude that their future use in paints is extremely limited.[8]

Plasticizers

According to Hedrick and Lawrence, pinonic acid shows promise as a plasticizer.[9]

Two German patents deal with plasticizers for varnishes. The first of these (Hönel; Reichhold Chemie A.-G.) deals with modified non-curing urea resins; the second covers plasticizers obtained from chlorinated hydrocarbons of the fraction boiling at above 150°C. of the CO hydrogenation.[10,11]

Miscellaneous

A paper by Giesen deals with the effect of ultra-violet radiation and its absorption by ultra-violet absorbers in synthetic resins and pigments. Giesen reviews the effect of such radiation on various materials, particularly the deterioration of a number of types of coatings. He discusses the chemical compounds used as absorbers, among them benzophenone, salicylic acid, cinnamic acid, and benzotriazole derivatives. The extinction in the ultra-violet range was measured for certain of these compounds. Different techniques for testing light-stability are considered, and the results of practical tests using various absorbers in synthetic resins and pigments are reported. In a concluding section, discussing the application of these procedures, the author points out that ultra-violet absorbers must be adapted to specific purposes and products to obtain maximum results.[12]

An article by Griffin is devoted to the employment of silicones in hammer finishes. The author makes the point that the partial incompatability desirable in such finishes may be achieved with silicones. Effects of variation of the amount of silicone and of composition of solvent were investigated in finishes based on nitrocellulose, and on alkyd and urea resins.[13]

Gherson reviews the properties of chlorinated paraffin, noting that recent cuts in cost of production have made it possible to consider its use in paints.[14]

A paper by Esposito and Swann details a technique for determining chlorendic acid in fire-retardant paints; a titration method is used.[15]

A paper by Bell and Bobalek is devoted to results of a study of soap dialysis in polystyrene latices, using radiotracers. The system they describe employed the exchange of potassium laurate and stearate soaps from a micellar solution into a micelle free polystyrene latex.[15a]

An article by Eirich and Lauria deals with model experiments on rewetting of chalked paints. The authors found that several wetting agents they tried were not actually well suited for rewetting. It is their conclusion that, at least tentatively, water-soluble polymers or colloids should be given first try in rewetting experiments.[15b]

An article by Chatfield discusses the replacement of phthalic anhydride by dimeric fatty acids; replacement of the anhydride in 3 alkyd formulations by the fatty acids made possible a reduction in processing time. Some film properties were improved.[16]

New applications for synthetic resins, using sand as a filler, are reviewed by Orlowski. The sand-filled resins are suitable for prefabricated building panels, protective coatings for metals, moldings, packaging materials, etc. Addition of sand markedly increased hard-

ness, resistance to abrasion, at the same time reducing costs.[17]

A paper by Whiteley deals with microbiological attack on paint films in the tropics. The author describes the types of molds and algae, the conditions that encourage them, and their effects. He then discusses the relationship between their occurrence and paint components and properties. Results of exposure tests are presented, and Whiteley concludes that the duration of mold resistance of exterior decorative paints is less than their protective life.[17a]

Ludke discusses self-sanitizing paints, with particular emphasis on fungicidal compositions; his article reviews work done here and abroad.[17b]

A paper by Falconer is devoted to hygienic paints; he covers coatings important in any installation where protection against molds, fungi, or insects is vital.[17c]

Hoffmann and Georgoussis devote a paper to the use of phenylmercury compounds as fungicides.[17d]

Patents

A British patent (Cox and Swann; Beck, Koller & Co.) deals with thixotropic materials for paints, varnishes and printing inks.[18]

Another British patent (Guest; Imperial Chemical Industries Ltd.) covers stabilized poly (vinyl acetate) dispersions; some of the partially hydrolyzed poly(vinyl acetate) is replaced by a water-soluble polysaccharide—starch dextrins, or starch ethers.[19]

A French patent to Wallon covers fireproof resinous coatings; these contain an emulsion of poly (vinyl acetate), natural or synthetic latex, polyacrylates, polyacrylonitriles, or other polymers; an inorganic filler; an inorganic pigment; a heavy solvent; and a non-combustible, chlorinated plasticizer; and/or triphenyl or tritolyl phosphate; as well as products giving off a large volume of nitrogen at 120-160°.[20]

Hainz (Chemische Fabrik) patented polyphosphates which are added to paints in the form of complexing compounds with catalyzing metals.[21]

A German patent to Jensen deals with weatherproof paints for coating masonry or concrete; stone-powder, fine-grained sand, cement, powdered limestone, calcined soda, tartaric acid, and titanium dioxide are mixed in given proportions. The mixture is stirred with water when applied.[22]

Another German patent (Bollinger; Hermann Wiederhold) deals with afterglowing weatherproof paints, containing ultra-violet reflecting substances and fillers which do not absorb water.[23]

A Japanese patent (Yamamoto and Hamaguchi) covers heat-resistant and fireproof paints; these incorporate a powdered mixture of iron oxide, chromium oxide, and zinc oxide.[24] Another Japanese patent (Abe and Nishida; Dai-Nippon Paints Co.) deals with paint for protection against radiation; this uses indanthrene dye and a vinyl copolymer.[25] A third Japanese patent (Kageyama and Nakanishi: Osaka Metal Industries Co. and Kansai Paint Co., Ltd.) covers antifouling compounds for use in paints. These include benzensulfonyl fluoride, *p* - toluenesulfonyl fluoride, 4 - chloro - 3 - nitrobenzenesulfonyl chloride, 2 - chloro - 5 - nitrobenzenesulfonyl fluoride, *p* - chlorobenzenesulfonyl fluoride, among others.[26]

A Polish patent (Janiszewski) deals with the stabilization of zinc paint for cathodic protection of iron; acid components of the vehicle are neutralized.[27]

Several American patents should be cited. Kebrich and Stroebel (National Lead Co.) covered heat-stabilizing and plasticizing pastes for resinous compounds; these are made by agitating an aqueous filter-cake of a basic lead salt with a liquid water-immiscible organic plasticizer in the presence of 0.5-5% (by weight) of a 6-22 carbon-atom fatty acid.[28] Wade (to Metal Hydrides, Inc.) patented foamable heat-insulating resinous compounds containing borohydride blowing agents.[29] Water-dispersable interpolymers for coating compounds were patented by McKenna (Pittsburgh Plate Glass Co.) These were formed in a stable aqueous dispersion by heating a mixture of a glyceride drying oil with maleic anhydride, hydrolyzing the product with water, neutralizing with NH_4OH, and interpolymerizing the mixture with a vinyl monomer. The aqueous polymeric dispersion is useful for preparing hard-water-resistant coating compounds.[30] Kazenas (Switzer Bros., Inc.) patented fluorescent thermoplastic-resin pigments.[31]

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PRODUCTION

ONE of the most tedious and time-consuming operations in the packaging of paint is the affixing of bails (handles for cans) to one gallon cans by hand. In 1960, two leading can firms introduced automatic bail inserting machines, thus eliminating the task of putting them on by hand and enabling the plant to realize impressive savings in time and in costs. In addition to putting the bail on automatically, one firm's equipment also fabricates the bail from wire to coil. It is claimed that this particular equipment frees four men—bail maker, carter, sorter and inserter—for other production line assignments.

One of the most interesting pieces of equipment exhibited at the last Paint Industries' Show was a colorant mixture computer. This computer is said to be practical for fast, accurate shade matches and production color control in the coatings industry. Suitable pigments or colors to match the sample under all lights are quickly determined. The correct amounts of each colorant required are read directly from the computer dials.

Advantages of this computer, according to the manufacturer are increased production by reducing the number of adds required to correct a batch, improves quality by eliminating reliance on visual color judgements, simplifies formulation by reducing the number of pigments required to match a particular shade, and reduce cost by decreasing equipment occupying time and achieving more uniform production schedules.

The shortage of phthalic anhydride evoked considerable interest in the commercial production of alkyds based on isophthalic acid. In a paper delivered at the 1960 Federation meeting in Chicago by the C D I C Society, techniques for manufacturing iso-alkyds were presented. This includes laboratory work using a 4,000 ml. reactor, heated with glas-col mantle, equipped with agitator, inert gas regulator, air condenser, and recording thermometer. Both fusion and solvent cooking methods are mentioned. Lab work on long, medium, and short isophthalic alkyds with semi-drying and non-drying oils and fatty acids is covered.

Next the factory production of these experimental resins in a modern 1,000 gallon resin kettle in batches of about 12,000 lbs. is discussed. This work again parallels the lab work and covers the production batches of long alkyd resins, medium soya modified alkyd, and short soya modified alkyd. The paper also attempts to show that isophthalic acid by its structure is a natural for the resin chemist and if he will deviate from old style practices and thinking, can be used to produce satisfactory alkyds.

General

A regular feature of PAINT AND VARNISH PRODUCTION is the column of Lawrence Shatkin, which deals with current advances and problems in the manufacture of paints and allied products. This review will single out two of Shatkin's articles for particular emphasis. The first of these is a study of the application of statistical methods to certain aspects of paint manufacture. In two parts, the article discusses frequency distribution, measurements of several technical values that determine paint quality, certain factors of correlation, and general techniques and theory of sampling.[1] The second of Shatkin's articles cited here deals with the break-even point, which he describes as a "control technique." This point in product manufacture, as the author emphasizes, is the point where "sales income balances expenses, and no profits and losses occur." Shatkin discusses the importance of this point to policy-making and describes in some detail how the point is determined.[2]

In a general vein, Warner surveys some of the chemical engineering problems particular to the paint industry. He points out that, since the industry relies on batch operations, conditions within it are somewhat unsteady. He discusses basic requirements for an esterification and polymerization plant; these include batch capacity, heating and cooling, stirring, adding and withdrawing materials, observing, measuring and controlling, condensing vapor, and producing vacuum.[3]

A paper by Fuller discusses the question of paint laboratory efficiency; the author covers factors of personnel, physical facilities, equipment, layout, information availability, production schedules.[4]

In an article of interest to almost any manufacturer of paint chemicals, Kern and Kenworthy discuss some of the broader problems of compounding; their workable method of approach "may lie in the border area where philosophy and mathematics meet, where not all of the reasoning can be justified beyond shadow of a doubt." What they object to, particularly, is the merging of many dissimilar criteria into a single number to convey "degree of goodness". The authors point out that the atmosphere of the quality research laboratory is all too often one of considerable strain, where the problem of solving an immediate deficiency (in response to a customer complaint) may override a more integrated and fruitful experimental attitude. They argue for a rational, scientific attitude, and cite alternative procedures for advancing such an ideal.[5]

Two papers in *American Paint Journal* deal with an interesting question of public relations: the odor of the paint factory; how it may incite the antagonism of its immediate neighborhood unless properly treated or explained.[6,7]

The September, 1960, issue of PAINT AND VARNISH PRODUCTION carries a number of articles of interest to the paint production manager. In the first of these, techniques of safety around the paint plant are discussed at some length; flammable materials are cited, with the means of insuring their safe storage and use.[8] Second paper describes a hydraulic jet cleaner, which cuts ball mill cleaning time; the technique is being satisfactorily employed at the Bound Brook, N. J., plant of the American Cyanamid Company.[9] Methods of cleaning production equipment with a non-flammable remover are mentioned in the succeeding article.[10] Next,

the cleaning of mixing tanks with a pneumatic cleaning tool is described (U. S. Air Tool Co., Elmont, Long Island, N. Y.)[11] In the same issue a paper describes how to keep batch records for easy access; a vertical filing system is recommended.[12]

Bedford lists fifty factors—a "safety check list"—for evaluating the safety program of your plant; these range from the personnel and their training to equipment.[13]

Pigment Dispersion

The magazine *Paint Technology* carries a lengthy series on the equipment of paint factories.[14]

The use of plate type impellers as a new approach to pigment dispersion is described by Purcell. These are said to transmit a maximum of energy to the mix. Such equipment, in the opinion of the author, can be used in some cases to produce finished paints.[15]

An article by Dantuma is devoted to gauges for the measurement of fineness of grind in paint, including such instruments as the Hegman Gauges. The author emphasizes that these instruments are liable to wear in a comparatively short time, so that scale reading may sometimes deviate considerably from actual or original values. Main difficulty occurs on the scraper blade; specifically on the two sides in contact with the steel block during application. Dantuma reports results of tests with a number of different gauges, and notes that some of the new machines show unacceptable deviations between actual groove depth and that indicated by the scale; he recommends a regular checking of the instrument used.[16]

PAINT AND VARNISH PRODUCTION carries a detailed review by Jebens on ball mill operation. In the first part of his paper, the author discusses characteristics of such mills and grinding balls, and the importance of pigment particle size and consistency as they apply to ball mill operation. The second part of his paper considers variable factors in the use of ball mills for dispersing and grinding pigments to size and agglomeration.[17]

In this area, the same journal carries a review of German advances in roller mills.[18]

In *Verfkroniek*, Van der Leeuw reviews some recent types of milling machines: the Beken Mixer, Cowles Dissolver, Kady Mill, Torrance Automatic Process, and so on.[19]

Kocian discusses the pigmentation of paints and printing inks without preliminary grinding; he describes a process said to eliminate any grinding apparatus.[20]

Dispersion of micronized pigments is discussed by Wade and Taylor. Two sets of experiments, designed to produce formulations giving best results, are described. The work and equation of Guggenheim (*Off. Dig.* 30, 1958, 729) were utilized for both sets. The apparatus employed included the Torrance cavitation impeller P2 and the Cowles dissolver. According to the authors, micronized pigments lend themselves to rapid dispersion in paint media when these mixers are used.[21]

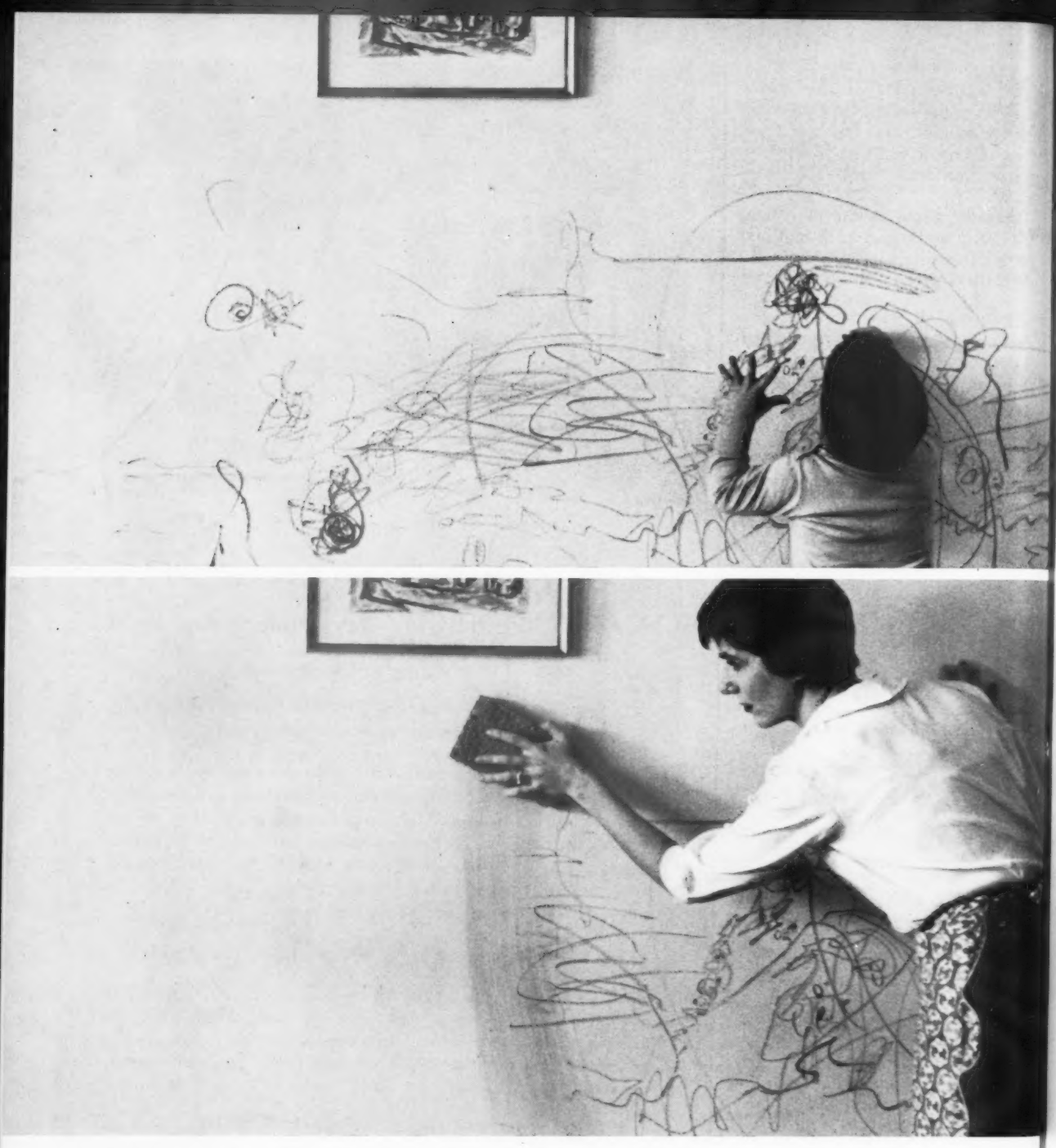
Miscellaneous

Dealing with color trends and preferences, Birren cites results of studies of color preferences in Great Britain, and offers some comments on the future trends in England. He notes differences between American and British tastes, and doubts that American predilections will become popular in Britain.[22]

A paper by Tilleard, reporting results on experiments on color perception, should be cited here, though its content is properly in the realm of the psychology of perception.[23]

A radiant heating system for varnish production, found by Sinclair and Valentine to increase varnish production rates, improve quality, and increase kettle life are described in PAINT AND VARNISH PRODUCTION.

One processing innovation of outstanding interest is the use of three Duradiant-burner-fired enclosed settings for "cooking" varnishes in their Secaucus, New Jersey, plant, where varnish and ink are under production. The Duradiant burner heating has meant a marked improvement in quality of varnishes. In addition it allows shorter cooking cycles, better control of color, viscosity, and acid value. Also each Duradiant cluster provides wide range of heat input for its respective kettle.[24]



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COATINGS CORROSION APPLICATION

AFTER many years of extensive research and testing, latex paints for exterior wood were marketed to the consuming public in the Spring of 1960. Consumer reaction to this new concept in house paints was most favorable because of the remarkable performance qualities of these paints plus their easy-application and clean-up features. Claimed advantages of these water emulsion paints include quick drying, high resistance to fading, yellowing, cracking, blistering and peeling, and increased durability over conventional house paints.

Producers of such paints insist that application instructions must be adhered to the letter for these latex paints to perform successfully on exterior wood. As a result they have gone to great length to impress the user of the importance of following directions. For example, one manufacturer has this warning printed on the lid of each can:- "Use this unusual new paint as directed or please don't use it."

Most instructions recommend careful surface preparation followed by an oleoresinous primer. However, an all latex system-primer and top coat—is most desirable. Such systems are currently being evaluated and have shown considerable promise in exposure testing programs.

The development of urethane coatings for marine uses, floors and exterior wood surfaces will do much to push the urethane coating market to new high levels. Oil modified urethane coatings, which require no mixing of components prior to application and which can be applied like any ordinary paint, are growing in popularity. Estimates are that by 1964, sales of urethane coating will amount to 6 million gallons.

Epoxy coatings continue to show a healthy growth. One of the most important development projects involving epoxy coatings is in the application of 100 percent solids coatings. The economics of such systems, particularly in product finishing, are obvious.

Continued commercial development of hydrocarbon has revealed unusual adaptability to high speed or "instant cure." Direct flame impingement, flame spraying, high energy infrared have all been used to cure thin films (up to ¾ mil) in less than 10 seconds. Resulting finishes are tough, adhesive, and resistant to many chemicals and corrosion.

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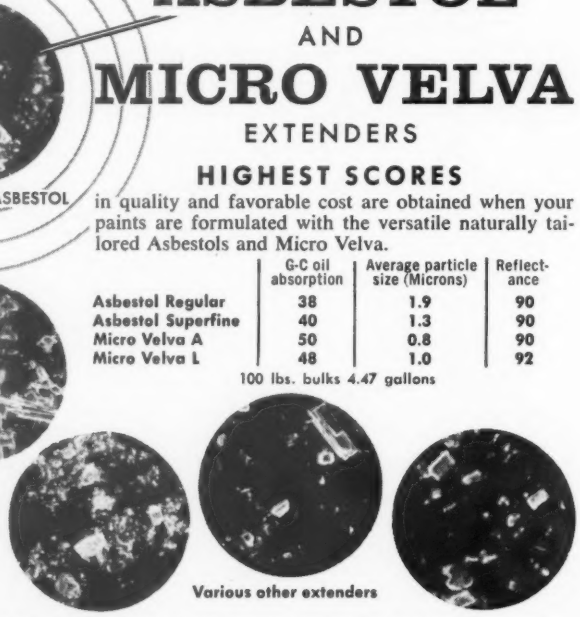

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Industrial Coatings

Farrow reviews in some detail the properties and uses of water-thinned coatings used as industrial finishes. He concludes that "there are, as yet, no substantial cost savings on the paints themselves, but it is certain that once these systems are established in the finishing plant, there will be some reduction in the cost per unit treated... Finishing paints are still in the final development stage and it will not be long before complete water-based industrial coatings become available."[1]

A melamine-acrylic water-soluble resin for industrial finishes is the subject of a paper by Hensley and West. They describe the properties and formulation of "Melaqua" 600 (American Cyanamid Co.), said to have a "broad range of utility in industrial and decorative finishing." In appearance, gloss, hardness, salt spray resistance and durability, the new finish is claimed to bear close comparison to conventional melamine finishes.[2]

An article by Howard and others reviews the combined work of six American refineries, intended to improve exterior painting standards, and including the development of paint material specifications. Various formulations are given, and the application of several systems is tabulated. The systems discussed here are epoxy coatings; the authors note that the use of such coatings in petroleum refineries is relatively new. There is some promise of lower costs in their use.[3]

Finn, in considerable detail, reviews modern vehicle finishing paints and their application. He cites some of the problems encountered, among others those of mold growth and loss of gloss and color under tropical conditions.[4]

Fry and Bunker write about wetting, film formation and other problems in water-based industrial stoving paints, with particular emphasis on the physical chemistry of the phenomena. Among other things, the authors discuss some electrical investigations of latex film structure; results they obtained tend to support the idea that certain latices, at least, give stoved films in which the water-soluble material is distributed in the form of a continuous network rather than in discontinuous pockets.[5]

A series by Brushwell covers coatings for non-structural surfaces.[6]

During the year Owens-Corning Fiberglas announced production of a "reinforced" spray coating, containing glass flakes, said to produce a hard, thick barrier consisting of multiple layers of glass interleaved in a polyester resin. Working equally well on metals, wood, or concrete, the coating is said to be particularly suited to protecting storage tanks, ducts, and so on.[7]

Culshaw deals with lacquers employed for cans—their formulation and adaptation to specific contained materials, including vegetables, meats, fruits, and beer.[8]

Van Loon goes into some of the problems of painting wood surfaces.[9]

A paper dealing with irradiation of paints should be cited; Jedlinski and others deal with the influence of gamma-radiation and neutrons on the properties of lacquer coatings. In their work, lacquer coatings of chlorinated rubber, chlorinated poly(vinyl chloride), poly(vinyl butyral), copolymer of vinyl chloride and isobutyl ether of poly(vinyl alcohol), modified alkyd resin, polymerized linseed oil, and modified formaldehyde resin were gamma-irradiated; changes in their properties were measured: impact strength, elasticity, and adhesion.

Coatings of poly (vinyl butyral), copolymer of vinyl chloride and isobutyl ether of poly(vinyl alcohol), alkyd resin, and polymerized linseed oil showed better elasticity and impact strength than did those aged in air, but coatings containing chlorinated rubber, chlorinated poly(vinyl chloride), or modified formaldehyde resin became rigid and less adhesive[10]

Luminescent paints are covered in technical detail by Deribere. Their formulation, properties and uses are described.[11]

A German journal carries an article by Oelsner dealing with the permanent heat stability of coatings.[12]

In a paper by Fabian, low-cost coatings for metal products are discussed; included in his "manual" are selected organic coatings, hot dip coatings, immersion coatings, vacuum metallized coatings, chemical conversion coatings, and rust preventives.[13]

Flame-protective paints are covered by Schwenk. This is a review article; a new flame-test apparatus, using a 1000-W incandescent lamp to heat the sample is described and illustrated.[14]

The pretreatment of zinc before painting is subject of an article by Rajagopalan and Annamali. Phosphate-treated zinc-on-iron surfaces coated with an air-drying enamel and scratched will not show rust spread where scratched during a 300-hour slat-spray test at 50°C., whereas untreated or chromate zinc surfaces do. Similar results were recorded with baking enamels.[15]

Abdul Karim and others treat of silicone-alkyd copolymers and their application to high-temperature surface coatings. They studied the effect of alkyd and silicone components on the properties of copolymers prepared by removal of alcohol by distillation during addition of silicones to thermal condensation product of polyols and mono-and dibasic acids. These were evaluated as varnishes and in enamels for gloss, thermal stability, hardness, etc.[16]

Patents

A Belgian patent (van Rolleghem) covers wood and cardboard rendered fireproof by coating with a paint-like mixture comprising sodium silicate, potassium silicate, magnesium silicoaluminate, or other silicates, graphite, calcium carbonate, barium sulfate, etc. The mixtures also possess bactericidal and insecticidal properties and have improved mechanical resistance.[17]

British patent 830310 deals with organic coating compositions improved by addition of a small amount of monopropyl siloxane.[18]

Mme Montand patented (Carbone Lorraine) paints based on tar-furfuryl condensation products. These are heat-resistant, impermeable, parasiticidal, fungicidal, and corrosion-inhibitive. The paint is useful on wood, textiles, ceramic materials, coatings, etc.[19]

A large number of German patents dealing with industrial coatings can be cited. Kloepfer and Schweitzer (Deutsche Gold- und Silber-Scheideanstalt) patented varnishes free from sedimentation products; they are improved by addition of up to 6% highly dispersed metallic or metalloid oxides with particle size of less than 0.05μ.[20] Hultzsch (Chemische Werke Albert) covered fast-drying resinous varnishes; these are obtained by addition of phenolic resins to solutions of hard resins in organic solvents.[21] Nowak and Bollig (Licentia Patent-Verwaltungs G. m. b. H.) covered stoving enamels (especially wire-coating enamels) based on silicone resins.[22] Similarly, Bergmann and others patented stoving enamels prepared from solutions of the neutralization product of humic acids, especially those obtained by oxidation of coal, a mixture of unsaturated fatty acids, and amines or mixtures of amines.[23] Reinhardt and Drube (Wasag Chemie A.-G.) patented light-fast cellulose nitrate lacquers; in their procedure, cellulose lacquers containing isopropyl alcohol and aromatic hydrocarbons are stabilized to fading by the addition of a small amount (0.005-1% by weight of cellulose nitrate) of one or more substituted benzo-phenones.[24] Silicone coatings are patented by Hrubesch.[25] Walen (E. I. DuPont de Nemours & Co.) covered alkyd-melamine varnishes; butylated hydroxy methyl melamines are combined with coconut-alkyd resins; on further treatment varnishes are obtained with a good gloss even in open-air weathering.[26]

The peeling of paint on glued wood articles is prevented by a procedure patented by Jaeger; this treats the wood before gluing with thin oil-free nitrocellulose solution; the wood is then dried, glued with a synthetic glue; the glued article is then retreated with the nitrocellulose solution. After this a paint is applied.[27] Klempt and others (Bergwerksverband G. m. b. H.) patented industrial baking varnishes.[28] Pöschmann (VEB Emailleguss Radebeul) covered heat-resistant enamels, incorporating 10-60% siderite flour or 5-20% feldspar.[29] Grosskinsky and Thürauf (Bergwerksverband G. m. b. H.) patented ester amide lacquers; these were prepared by esterifying polybasic acids or their anhydrides with less than the theoretical amount of alcohols, and neutralizing the esters with amines; the resulting compounds are diluted with solvents or water and applied by painting.[30] Michels (Deutsche Gold- und Silber-Scheideanstalt) patented shrinkage enamels; alkaline compounds such as NaOH or KOH are added singly or mixed with the enamel slurry.[31]

Yamamoto and M Hamaguchi patented heat-resisting and fireproofing paints.[32]

A number of Russian patents in the field should be cited. Maiofis and others covered heat-resistant varnish, using terephthalic acid as a base.[33] Nekrasov patented a method for determining the adhesion of varnish to metallic surfaces. The adhesion is determined from the capacitance of the film at zero-1000 cycles/sec. Strength of adhesion is then estimated from the ratio between the difference in the two capacitances and the capacitance determined at 1000 cycles/sec.[34] Andrianov and others patented organosilicon varnishes.[35] An anti-friction varnish was patented by Chegodaev; this is prepared by combining an alcohol solution of Bakelite and poly(vinyl butyral) with an aqueous suspension of photoplast-4 and acetone.[36]

Greenstein and others (Francis Earle Laboratories, Inc.) patented irridescent coatings; genuine pearl effects on glass or plastic were obtained by depositing an inorganic matter or natural pearl essence of high refractive index, on which is dipped or sprayed a chemically-compatible lacquer.[37]

Absorbents for organic liquids in lacquer or paint spray chambers were patented by Schmid-Nicoli and others (CIBA Ltd.); absorption of the organic liquid spray by surface contact with water is improved if the water contains a swellable organic colloid.[38]

Cresylic-acrylic resin-polyamide varnishes for laminates were patented by Honnen (Richardson Co.).[39]

Sloan and Mann (Atlantic Research Corp.) patented nitrocellulose lacquers.[40]

A mustard-gas destroying paint, containing a highly chlorinated rubber base, chlorinated paraffin, Titanox titanium dioxide, ultramarine blue, lamp-black, *sym*-dichlorbis (2,4,6 - trichlorophenyl), urea, and tetrachlorethylene and phenyl chloride is covered in a patent granted to Scherr (to United States Government).[41]

Godschalk (E. I. DuPont de Nemours & Co.) secured a patent on methyl methacrylate polymer-polychromate coatings.[42]

Rasmussen and Sears (Sherwin-

Williams Co.) patented nitrocellulose alkyd-melamine aldehyde compositions.[43]

Shenk (Ideal Chemical Products, Inc.) patented flame-resistant compositions for coating metal, wood or glass.[44]

Architectural Coatings

Low-luster house paints are the subject of an article by Ferrigno. He discusses critical pigment volume concentration in detail, covering preparation of paints of specific excess binder content (with formulas), and describing blister resistance and absorption tests, as well as brush and levelling comparisons. He also considers viscosity relationships.[1]

A panel discussion in the *Official Digest* compares conventional exterior paints with emulsion exterior paints.[2]

Patents

A German patent (Jensen) covers weatherproof paints for the coating of masonry or concrete.[3]

Lyons and Carlson patented masonry water-repellent compositions. These are a mixture of 1) from 65-85% by weight of a methyl siloxane having a composition of 65-80 mole % monomethyl siloxane, 15-30 mole % dimethyl siloxane, and up to 5 mole % trimethyl siloxane, the siloxane containing 1-12% by weight of silicon-bonded methoxy groups; and 2) 15-25% by weight of a monopropyl siloxane containing 15-60% by weight of silicon-bonded ethoxy groups.[4]

A Canadian patent (Nordstrom) covers a water-repellent coating made from a silicate, a latex binder, and a waxlike agent. Potassium or sodium silicates can be used in exterior masonry coatings if a waterproofing agent is present; examples of such agents are waxes, silicones, or stearates, or mixtures of these. Such agents migrate to the surface when applied to masonry. Latex binder is added to plasticize and to provide better resistance to water, and filler added to lower the cost.[5]

Marine and Traffic Paints

An article by Talen deals with the subject of protective paints on ship and in ports.[1]

Fisk writes about anti-fouling without paint, attacking in some detail the classical theory that behavior of antifouling coatings is to be explained as a leaching process.[2]

In *Paintindia*, Banfield has a review article on marine paints and their composition. This describes various types of paints employed for particular purposes.[3]

Gault and others describe continuous road tests for determining the performance of traffic paints. Purpose of the tests was to compare performance of Parlon-65% soybean oil-glycerol alkyd paint with a similar paint containing the corresponding pentaerythritol alkyd; to investigate the performance of long oil Pamak-pentaerythritol alkyds; to compare Parlon-alkyd paints of varying Parlon content, to determine effect of chlorinated rubber on performance; to compare night visibility of paints containing premixed beads as opposed to paints containing beads added by "drop-in" method; and to compare a variety of experimental paints with several commercial paints. Since not too much is published on this subject, the results will be cited here in some detail. It was found that the Parlon - 65% soybean - pentaerythritol alkyd resulted in better overall performance than all other paints tested; that long oil Pamak 4-pentaerythritol alkyds can be combined with chlorinated rubber to produce high quality traffic paints (a 70% Pamak alkyd was among the best paints tested in dry time and durability); that lower night visibility was shown at all stages of the road tests by the paints containing premixed beads; that the better Parlon-alkyd experimental paints excelled all the commercial paints in durability, while all of the paints containing chlorinated rubber dried much faster than commercial paints with no chlorinated rubber.[4]

Patents

A British patent to Minnesota Mining & Manufacturing Company dealt with reflecting pigments and compounds for highway signs and markers.[5]

Corrosion—General

Fisk deals in considerable detail with the theory of anti-fouling. He emphasizes the close link be-

tween corrosion protection by organic coatings and anti-fouling behavior, and advances the idea that the behavior of anti-fouling coatings may be explained on the principle that the coating is a saturated gel obeying the known physical laws governing the behavior of gels. In more practical terms, he suggests the design of an antifouling system based on this new idea; the requirements for this system would be 1) passivation of the steel by the use of a good anticorrosive primer; 2) building up of a chemically inert coating with a high electrical resistance to prevent the transport of ions across it; and 3) formation of a strong open-textured gelatinous coating of anti-fouling composition allowing ionization of the toxic substances and retaining the ions within its structure.[1]

Nedey discusses in some detail the use of wash primers for corrosion protection of metals. Composition and manufacture, application, and structure and formation of films in such washers are reviewed.[2]

Brunt discusses the phenomenon of blister formation in paint as an effect of swelling due to water.[3]

Nijveld devotes a review to the subject of the protective coating of iron. His general article discusses chemical composition of the various systems making up the complete protective coats, as well as some of the environmental factors that must be considered. It includes an evaluative bibliography of a number of recent references.[4]

In the *Official Digest* for December, 1960, a three-part discussion covers metal protective maintenance painting. First, Shanks deals with the maintenance painting of fresh water steel structures, covering various kinds and types of paints—phenolic varnishes, coal-tar coatings, epoxy, zinc-rich coatings, urethane paints, vinyl paint systems, and the selection of the right type of system for the right purpose.[5] Second, Devoluy deals with the maintenance painting of ocean-going ships; he considers painting of the hull, and the performance testing of paints, among other things.[6] Concluding paper of the panel is by Frye; this deals with maintenance painting of structural steel.[7]

In this same area, Kirkendall writes about testing of protective coatings for metals. His two-part article, aimed primarily at waterworks installations, public utilities and aircraft industries, deals first with the principles and practices of a new indicator solution and electrolytic conductances tests on protective coatings for pipe lines. Second part of the paper considers practical methods and procedures for obtaining and recording laboratory test data in performance.[8]

Bose and Mukerji report the results of work carried out in India on accelerated weathering tests of paints; primarily those intended to protect installations from corrosion.[9]

Some of the problems of corrosion resistance in the aerospace industries are discussed by Cole. His article touches briefly on the application of paints, particularly of epoxy resin paint.[10]

Ousbey deals with protective organic paint coatings. His detailed paper covers the properties and applications of alkyd resins, epoxy paints, silicone-based paints, chlorinated rubber and isomerized rubber paints, phenolic resins, dispersion resins, and vinyl resins. The author notes that no resin "in its own displays all the qualities called for in a protective coating, but when intermixed during manufacture with other resins and paint media, frequently produces a paint that is ideal for a particular purpose."[11]

A paper by Speight describes two oxidized rubber paints, which differ in their degree of oxidation and viscosity, but are alike in being corrosion resistant and in withstanding high temperatures. The lightly-oxidized produce (Lorival R3B) can be used in flat paints and undercoats, to which it imparts good flow and non-settling properties. The highly-oxidized product (Lorival R200) can be used alone for corrosion and heat resistance.[12]

In the area of zinc paints, an article by Sagel records some practical experience in corrosion protection.[13] MacLellan briefly surveys recent developments in this field.[14]

An editorial in *Corrosion Prevention and Control* points out that, in protecting ship hulls, a highly resistant and protective coating should be used even where cathodic protection is employed. Specifically, the need is for a coating resistant to the alkaline conditions created on the hull or other surfaces near the anodes.[15]

Corrosion prevention with asphalt emulsions is subject of a paper in the same journal.[16]

Vaughan discussed low-pressure enamel spraying techniques.[17]

Shideler, in a paper on pipeline coatings, covers coal-tar and asphalt-based compounds.[18]

Silicone treatment of masonry and concrete to reduce corrosion attack is dealt with in *Corrosion Technology*. The value of the silicone coatings in the protection of older structures and as "built-in" maintenance is cited.[19]

The use of bitumen in paints was subject of a paper by Duligal. He considers choice of solvent for such paints, and their application for anti-corrosion and other purposes.[20]

Epoxy

Epoxide resins for corrosion resistance are the subject of a paper by Powell; these are "Epikote" resins, which the author concludes are worth consideration in corrosive conditions.[21] Dealing also with "Epikote" coatings, a paper in *Corrosion Technology* discusses their application to steel hulls and the superstructures of ships, and to the tanks of oil tankers.[22]

Rust-Inhibiting Pigments

Red-lead is the subject of several papers. Walker covers red and white lead for the protection of iron and steel. He emphasizes that red lead primers afford protection to these metals, the protection being both mechanical and electrochemical. With paints pig-

mented with white lead as undercoat and finish, many anti-corrosive properties are met. Walker discusses the composition of various types of paint for securing best results.[23] Yarvenkyla describes results of work done in Finland which is said to show that the addition of activators can influence the rust-resisting properties of paints based on red lead.[24]

The properties of molybdate pigments as corrosion inhibitors are discussed by Schoen and Brand. Their work included a study of calcium and zinc molybdates to determine their corrosion inhibiting properties; in some instances, these pigments (alone or with a topcoat) showed greater anticorrosion characteristics than did red lead under the test conditions.[25]

Wesson deals with rust inhibition through calcium plumbate pigments.[26]

Water-Emulsion

Discussing an anticorrosive water-emulsion for metal surfaces (especially new galvanized steel). Frank reviews the difficulties encountered in preparing and decorating such steel surfaces, and advocates use of an oil-free polyacrylic dispersion paint, formulated with a pigment-binder ratio that assures durability. The new paint contains zinc chromate to inhibit corrosion. Frank describes tests with various formulations, and recommends a particular formula and procedure as guides for further individual developments. The oil-free paint suitable for one-coat application over new untreated, or old unpainted galvanized steel contains a pigment mixture consisting of 325 parts natural red iron oxide, with 100 parts mica and 75 parts zinc chromate; this is prepared using 33.3 parts pigment dispersant and 150-165 parts water, in a ball mill geared to maximum grinding efficiency. Final preparation depends on amount of the batch. For application, a wide distemper brush, with long soft bristles should be used. Salt-spray test showed that the paints had remarkable resistance to salt-laden atmosphere for more than 750 hours, and outlasted nearly all comparison paints. In prolonged weathering tests the acrylic paints also showed excellent results. The paint may be used successfully as a primer under topcoats, thus prolonging the life of such systems appreciably. The results of the tests described by Frank are interpreted to indicate that water paints properly prepared can be satisfactory when applied to metal surfaces.[27]

Special Studies

An article by van Laar considers in detail the phenomenon known as the DIA effect: a completely painted steel panel, immersed in fresh aerated water, develops few or no blisters on the side opposite to the side where the metal is

laid or left bare and therefore corrodes; on the other hand, where little or no blistering occurs, corrosion appears under the film. Development and suppression of blister have been shown to result from the action of atomic hydrogen generated by corrosion on the bare spots; this diffuses across the metal to the "DIA", reducing the oxygen and hence causing corrosion by differential aeration. The DIA phenomenon is influenced by pretreatment and by the kind of paint used; for example, an interlayer of copper in the steel panel causes it to disappear, an interlayer of chromium steel does not. The DIA effect may be produced by electrolysis (instead of by corrosion) at bare spots. Van Laar reports that measurements of potential, and gas analysis, have substantiated the atomic hydrogen explanation of the DIA effect.[28]

In an Italian journal Rivola deals with the electric evaluation of metal protection by lacquering. A square-wave current is applied to the specimen; electrical restivity is then determined in corrosion tests versus time, and is correlated to behavior of the protective coating (glycerophthalic, vinylic, oleoresinous, etc.) submitted to salt spray, high humidity exposure, alternating and steady immersion, and so on. Results are extensively charted.[29]

A study by the Pittsburgh Society for Paint Technology was published in the *Official Digest.* This reported some results of an examination of factors affecting rusting steel and blistering of organic metal coatings. The Society made determinations of water and oxygen permeability, water absorption, water extractibles, variations of osmotic pressure and adhesion on seven unpigmented coating vehicles for steel, and attempted to correlate their results with rates of blistering during water immersion. It was found that high extractibles, poor adhesion and high oxygen permeability increase failure.[30]

The relationship of molecular structure and pigments to coating performance is covered by Payne. Dealing with protective paints, he considers molecular structure, significance and function of primary and secondary bonds, the relationship of molecular weight to performance. The function of modifiers and how these influence the properties of a coating are reviewed, and the mechanism of adhesion is briefly discussed.[31]

Helms devotes a paper to industrial applications of zinc-filled inorganic coatings; he compares the principles properties of such coatings with those of organic coatings; these include resistance to corrosion, surface preparation, undersurface corrosion. He also reviews the application of zinc-silicates.[32]

A paper by Casdorf deals with hazards in sand blasting and application of coatings; tests he cites showed that in no case could substances with sand particles in them be ignited, and that the sandblast stream played on burning compounds quenched the fire.[33]

A three-part article in *Corrosion Prevention and Control* includes a discussion of corrosion mechanisms and control techniques, including coatings.[34]

Patents

A Russian patents covers primers for metals; this consists of a mixture of phosphoric acid, pigment, bonding agent, and solvent.[34]

Three American patents should be cited here. Francis patented an anticorrosive ship-bottom paint.[35] Capthorne patented a protective coating for iron and steel; this is a plastic primer containing 30% reaction-product of a 30-65% fatty acid containing 16-40 C atoms, 30-65% lead oxide, 2-10% sulfur; and 35% calcium sulfate, 0.5% water, 15% phenol-formaldehyde varnish and solvent.[36] Gusman and Melamed patented a method of bonding methyl methacrylate film to primer coatings.[37]

Application

In *Electroplating and Metal Finishing*, Ousbey, in a two-part article critically reviews methods of paint application. He covers treatment of surfaces, and application techniques and tools.[1]

Also in a general vein, although in less detail, Elvart covers methods of applying paint by brush and roller; he cites the research being done in this field, opposing the view that "the paint brush is practically an obsolete tool."[2]

A paper in *Paint Journal* deals with the use of the airless spray for production finishing. The article points out the comparative wastefulness of compressed air as a vehicle, and advocates a wider use of "hydraulic atomization" in paint spraying: this is an airless system said to possess many advantages, at least in certain applications.[3]

A panel discussion in the *Official Digest* was devoted to some of the practical problems of applying latex paints to exterior surfaces.[3a]

The July issue of *Paint Journal* is devoted largely to problems and procedures of painting ships. The pre-launch painting of the hull of the new French liner, "France," is reviewed briefly.[4] An article following this (by Jackson) discusses preparation of steel in shipyards, citing some of the problems, and offering advice on meeting them.[5] The epoxy paint system being used for two new Pacific & Orient Line ships (the "Oriana" and the "Canberra") is discussed; following this, a paper by Stupples deals with modern methods of shipyard wood finishing, considering equipment, finishes and some problems of application.[6] In the same issue, Hartley reviews factors in the choice and application of surface coatings for marine conditions; these include corrosion, mill scale, weathering. His paper cites procedures for combatting all of these, and includes a review of various types of coatings, their properties and specific uses.[7] Two briefer articles deal with anti-fouling compositions.[8-9] Further papers in the issue deal with the development of flame-cleaning marine steelwork, and with the use of lead for protection of ships.[10] Final article is one by Elvin, dealing with paints for ship protection; this reviews the types and purposes of such finishes.[11]

Talen deals in some detail with the subject of the painting of wood with paint and varnish.[12]

Two papers deal with painting procedures where welding is involved. Brett devotes a paper to the repair work necessitated by corrosion damage.[13] A two-part series by Sloof covers the preparatory treatment of metallic surfaces and the application of paints for welding.[14]

In the field of particular industries, Jackson has a paper on maintenance painting of brewery installations.[15] An article by Falconer recounts in considerable and intereating detail the history of modern car finishes, with particular reference to the British industry.[16] Modern painting procedures in the food and drink industries are subject of a study by Elvin; he reviews the use of color for safety and efficiency in factories.[17]

An article by van Berk discusses what kinds of enamels can most suitably be dried by means of infrared radiation. His article covers some of the practical problems the paint rechnician encounters in stoving work, and cites both the advantages and disadvantages of using infra-red radiation.[18]

Color

An interesting paper in *Paint Journal* deals with the use of color in various types of industrial installation. In particular, the article relates the experience and ideas of Jenson & Nicholson, Ltd., but the data has wider application. Various considerations in choosing paints for special purposes are reviewed.[19]

The February, 1960, issue of *Paint Journal* contains a number of papers dealing with color. The first of these is an article by Johnston; he discusses the chemistry and production of organic pigments.[20] Following this, Falconer briefly reviews the application of colorants and mechanical dispensers, through which paint dealers can prepare an unlimited range of colors.[21] In another paper, the use of the Glasso Colourmeter is described.[22] An article by Plant and Varley considers the performance of pigments in present-day finishes. Their composition, the colors they produce, the hiding power of pigmented systems, dispersion and storage properties, solvent resistance and heat fastness are discussed here.[23] A briefer study by Bell deals with the color and design of paint tins.[24] A paper by Berry is devoted to lightfastness and color change.[25] This issue also contains a paper by Salzmann, covering color matching via pigment identification; this is concerned primarily with organic pigments, and with the type of matching (called critical), which is involved in providing pigments for an exact match to the sample submitted[26] Mitchell contributes an article on color trends and their influences; in the paper following color and temperature are considered.[27-28] An article by Hurst deals with the architectural use of color.[29] This issue also contains a number of articles directed to the interior decorator, and hence outside the province of this review.[30]

Stiles discusses the Color Gun (Autoblend Products Co., San Francisco), a colorant dispensing apparatus aimed primarily at the deal and painting contractor level. Experience with the new type of equipment, and its applications, are discussed.[31]

In the second paper of a series (that seems not to have been continued), Reese writes on the psychology of color, reviewing theories of color perception and attempting to define certain terms in fairly objective language.[32]

Four articles in *Paint Journal* deal with the increasing importance of architectural use of color in school design, with particular reference to English trends.[33-36]

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AEROSOL COATINGS

ONE of the most extensive consumer survey regarding the usage of aerosol paints in the United States was conducted by the Freon Products Division of E. I. du Pont de Nemours & Company. The primary aim of this survey was to locate marketing opportunities for the aerosol industry and to provide information which will be useful to aerosol packagers and marketers in their planning and merchandising.

The survey shows that spray paints are the fastest growing segment of the entire aerosol industry, sales having increased from about 23-million units in 1956 to about 60-million units in 1959.

One of the big reasons for this growth is the consumer acceptance of aerosol paints, particularly by men, according to the survey. Aerosol paints have been found to be a handy touch-up tool in and around the home. As a result they are replacing the half-pint sizes and less. The survey estimates that a half of the total sales growth in the past few years can be attributed to household use.

In industrial application, the aerosol paint can has become a standard tool in maintenance kits for touching up chipped soft-drink dispensers, gasoline pumps, tractors, etc. On assembly lines, it is used to touch-up automobiles, appliances such as gas ranges and refrigerators.

As far as the market for aerosol paints is concerned, the survey points out that only 13% of nation's families used aerosol paints during the last six months of 1959; almost two-thirds of all the families have never even tried the product.

The leading objection by non-users, is that aerosol paints are too expensive. Therefore, more sales effort demonstrating the easy-application properties of aerosol paints is recommended.

Some of the conclusions of the survey are:

"The existing market is a broad one. There is widespread use of the product in all geographic regions, in all sizes of cities and towns, and by all types of families.

"The existing market is also a selective one in some respects. The users tend to be in the upper income families. There are relatively fewer users in the South and in rural areas and more in the west.

"A relatively few articles account for most of the aerosol painting. Aerosols are creating new uses of their own-messy jobs (wicker furniture), hard-to-get-at objects such as radiators, small toys, difficult matching jobs such as touch-up on automobiles, refrigerators, and others."

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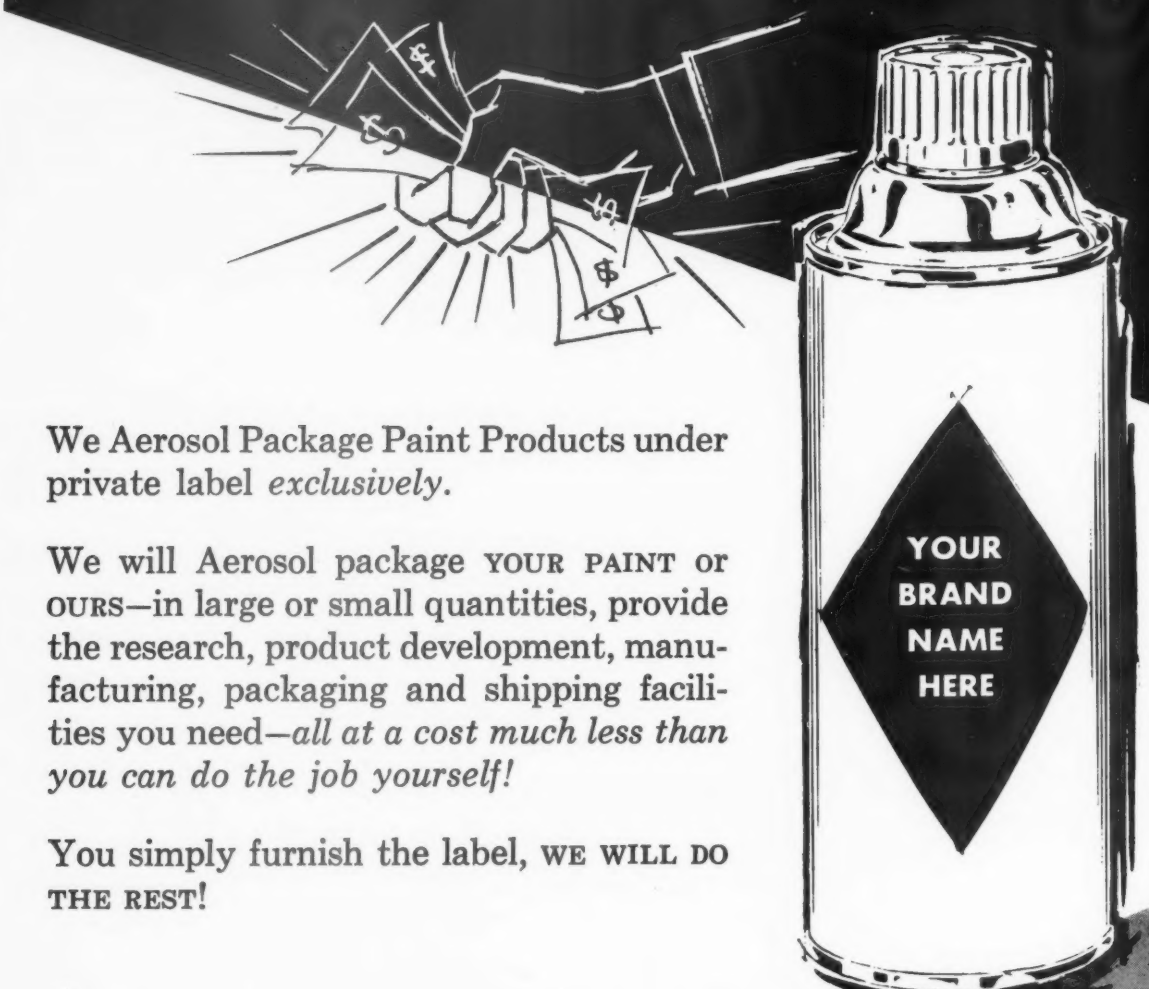

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General

PAINT AND VARNISH PRODUCTION began the year with a two-part discussion of developments in aerosol coatings by Roberts. The first part of his series deals with some of the problems that had to be solved before paint in aerosol containers became acceptable to the general public; part two deals with propellents and some general observations on formulation and labelling.[1]

A regular feature of PAINT AND VARNISH PRODUCTION is a column on aerosol developments, in which new products and ideas are presented.

Roberts discusses some consumer aerosol problems. These include disposal of container and the transportation of aerosols via airplane; the author points out that, with recent developments, the hazard of air carrying of these units is now an "old wives' tale".[2]

The same author emphasizes, in another paper, that aerosol units are consistently gaining the public confidence, with the overcoming of perils initially associated with their packaging and use.[3]

In this general area of consumer acceptance, Roberts writes on the subject of public regulations that affect paint aerosols. His paper cites particularly the CSMA flammability and combustibility tests, with a discussion of factors involved in these definitions and procedures.[4]

It should perhaps be pointed out here that the journal *Aerosol Age* carries a great deal of material that may be of both direct and indirect interest to the aerosol paint manufacturer. In the present review, however, only those papers directly pertinent to the field will be cited. In this journal Sherwood writes of new developments in aerosol paints; his particular area is propellents.[5] In this same area, Downing and Madinabeitia review problems of the toxicity of fluorinated hydrocarbon propellents.[6] A paper in the December issue of the journal cites some of the implications of a recent survey of the aerosol paint market by E. I. DuPont de Nemours & Co. A largely untapped consumer market is believed to lie ahead.[7]

Manufacture

The May, 1960, issue of PAINT AND VARNISH PRODUCTION is devoted particularly to aerosol coatings; five papers deal with particular aspects of the industry. First article, which is partly an economic analysis, points to the spectacular acceptance of these packaged products, and estimates their 1963 sales potential as above $150,000,000; this paper also covers some of the general considerations facing the manufacturer, including types of coatings and formulations.[8] Second article in this issue outlines the manufacturing procedures followed at Sprayon Products, Inc., Cleveland—one of the largest custom loaders in the field.[9] Third paper deals with the problems of labeling aerosol paints; this emphasizes that such units must be treated differently from conventional packages, because the customer is not yet fully accustomed to their use. In considerable detail, directions for proper labeling are cited.[10] In the fourth article in this special issue, McAnally discusses the manufacture of foolproof aerosol paints; the emphasis is on quality control. The paper is based upon the experience of Krylon, Inc.[11] Final paper in the series is a review, by Roberts, of new aerosol developments featured at the Packaging Show in Atlantic City, in April, 1960[12]

Filling

The question of whether or not aerosol products should be filled by the direct manufacturer or by an intermediate contract filler is covered by Roberts. Citing both the advantages and disadvantages of contract filling, the author concludes that there is a heavy place for the latter in many phases of the industry.[13]

Problems in the filling of aerosol paints are dealt with in PAINT AND VARNISH PRODUCTION. Certain fundamentals are considered here, including the two basic methods of filling: cold and pressure. The author then discusses propellent blending.[14]

McAnally, in another source, deals with technical aspects of paint aerosol loading; here again, his paper is based upon the wide experience in the field of Krylon, Inc. His paper covers cans, valves, propellents, paints, assembly.[15]

A broad review article by Phillips deals with aerosol containers; he devotes particular attention to containers made of tinplate, of aluminum, of glass, and of plastics: their properties, advantages, disadvantages, and applications. In addition, he deals with protective covers for valves.[16]

Containers & Valves

In PAINT AND VARNISH PRODUCTION, Roberts evaluates aerosol containers for packaging paint products, considering particularly the new "giant" aluminum types. His paper covers methods of fabrication, cost and corrosion factors.[17]

An article by Sciarra deals with aerosol valves. Pointing out that, in a very real sense, the valve is the brain of the unit, Sciarra discusses the parts that make it up, and some problems—such ad discharge rate, valve clogging, and vapor phase holes.[18]

Propellants

A paper by Brown deals with the effect of fluorocarbon propellants and methylene chloride on various plastics (these latter being used as aerosol container components). Brown's work details swelling characteristics of thirteen plastics—including Nylons 6 and 66, Teflon, Bakelite, cellulose acetate, Genetron VK, Saran, among others—in a number of propellants. The fluorinated hydrocarbons used as solvents for Brown's tests were those marketed commercially as 11, 12, 21, 112, 113, and 114a. So that comparisons could be made with a representative chlorinated hydrocarbon, tests were also run with methylene chloride. Methods used to determine swelling characteristics of of the plastics were essentially those of ASTM method D543-52T, with two slight modifications. Results obtained are extensively tabulated, in terms of percentage change in weight and dimensions. In general, it was observed that Bakelite, Nylon 6, Nylon 66, Saran and Teflon were only slightly affected by all of the solvents, and that—with the exception of propellant 114a, polyethylene showed a weight gain in excess of 10% after immersion in all of the solvents. Polystyrene broke down completely in most cases. Vinyl compounds were aattacked considerably by solvents containing hydrogen in the molecule. Brown concludes that increasing the fluorine content of the molecule, in the ethane derivatives, decreases swelling effects of the solvent.[19]

A two-part article by Sciarra deals with the testing of aerosol products. The first part of his study deals with questions of vapor pressure, solids content, volatile-non-volatile content, flammability and combustibility; the second part covers moisture determination and analysis of propellents.[20]

TESTING and ANALYSIS

A NEW method of studying various chemical changes in paints and other exterior coatings during outdoor exposure was developed by D. A. Hilliard of the Goodyear Tire and Rubber Co.

This method permits the compounding of more durable paint materials because it allows a more accurate evaluation of molecular changes during outdoor exposure.

Previously, such studies were confined to laboratory infrared tests, which utilized coated salt blocks. Because of the blocks' moisture sensitivity, this technique could not be used outdoors.

Goodyear's new testing method uses the spectrum (molecular fingerprint) of coating materials deposited on highly reflective aluminum or tin-plated steel panels. The spectrum is recorded by an infrared spectrophotometer before, during and after completion of outdoor exposure.

Measurements are made directly from coated panels by means of a reflector on the spectrophotometer and from the changes noted, the weathering rate is accurately measured.

Committee D-1 of the American Society for Testing Materials is currently engaged in an active program for developing new and improved test methods. Among these are methods for measuring resistance of organic coatings to perspiration; resistance of lacquers to printing; an accelerated test for the evaluation of the settled and re-suspension properties of flat lacquers; method for measuring adhesion; study of thixotropic properties of paint; methods of test for package stability; evaluation of the accuracy of color difference meters by means of color aptitude test; and test procedures for vinyl acetate, formaldehyde, acetaldehyde, and pentaerythritol.

Other important work include measurement of color changes of white architectural enamels, hiding power of non-chromatic paints; efflorescence of interior latex paints; urea content of nitrogen resins; hydrolyzable chlorine content of liquid epoxy resins; elongation of attached coatings with cylindrical mandrel apparatus; and water miscibility of isopropyl alcohol; methods of test for dilution ratio in cellulose nitrate solutions for active solvents and hydrocarbon diluents.

Performance Testing

A broad review article by Fisk covers some of the current problems facing the testing laboratory in the paint industry. While he does not discuss any particular test in detail, Fisk offers some cogent comments about the purpose and methods involved in testing various properties of paints.[1]

An article by Scott supplies something like a checklist for paint products. Writing about some of the simpler tests for ensuring quality of paint product, he includes a "paint production fault finding chart".[2]

Giaccardo describes a new apparatus for the accelerated testing of varnishes.[3]

Microscopic techniques of testing, as applied to the paint industry, are considered in detail by Charlett. He discusses the apparatus employed, preparation of specimens for micro-observation, temporary and permanent mounts, mounting agents and procedures, including labelling.[4]

In an article dealing with mechanisms of deterioration of house paints, Browne emphasizes that the products of decomposition cause different types of failure. Water, especially in conjunction with ultraviolet light, accelerates chemical deterioration. Shrinking and swelling caused by water also strain and disrupt paint films.[5]

A laboratory paint testing program is subject of a paper by Gackenbach. Various tests to determine quality of paint and primers are described. Results are evaluated on a basis of numbers—from 0 (very poor) to 10 (superior). Tests are said to be useful in selecting paints for further exposure tests and to help in rejecting inferior material.[6]

The August, 1960, issue of the *Official Digest* (Part 2) comprises a "comprehensive index of methods of test for paints and paint materials." This was compiled by the Standards and Methods of Test Committee of the Federation of Societies for Paint Technology.[7]

Johnson discusses the chemical nature of paint film surfaces—a major factor in determining the service performance of the paint.[8]

Tests for nitrocellulose lacquers are reviewed in an article in *Paint Technology*. In particular, the work of the Furniture Development Council of Great Britain is cited.[9]

Newton devotes a paper to a description of a glossmeter developed by himself; it is said to overcome difficulties experienced when measuring degree of gloss on exposure panels. These difficulties may be objective—they may depend, for example, on artificial illumination; or they may be subjective, and depend on observations made by different examiners. The instrument described by Newton has been used under a wide range of individual conditions, including artificial lighting, and is said to show remarkable consistent results.[10]

Oakley writes on the effect of weather conditions on gloss retention of alkyd paint pigmented with R-ititania. He is particularly concerned with the unreliability of certain criteria for evaluating the outdoor exposure properties of paints, and a major objective of the tests he describes was to indicate how close a correlation may be obtained by keeping a careful record of changing weather condi-

tions, and relating these to paint performance. In his work degree of gloss failure was shown to be closely related to amount of solar energy falling on the test panel, the total energy greater than a fixed threshold value being most nearly related to rate of deterioration. In this connection, the author notes that intensity rather than duration of sunshine causes failure. In the course of his studies, Iakley was unable to demonstrate any direct relationship between film failure and moisture, although he assumes it to play an important role.[11]

A paper by Hartmann discusses problems in the gloss measurement of coatings.[12]

An article by Dantuma reports results obtained by the "simple and inexpensive glossmeter" described by Newton (*Journal of the Oil and Colour Chemists' Association*, 43, 1960, 44). Dantuma's conclusion is that the usefulness of the instrument is limited, and that it cannot be recommended for general use.[13]

An article by Gray describes in detail the results of experiments dealing with the durability of exterior clear finishes for timber. 55 such finishes were examined, under natural weathering conditions, on oak and Western red cedar. The author points out that present taste is for the *natural* tone of wood surfaces in various architectural uses, and that this tone is actually extremely fugitive; moreover, unprotected wood surfaces are subject to deterioration. It is therefore desirable to protect them while trying to preserve something of their natural color. Gray's paper reviews the problems encountered in the use of the ordinary types of varnish and finish, citing the effects of type of timber, location, sunshine, rain, method of application, and so on.[14]

The physics of paint films is the subject of a paper by Phillips. In particular, he deals with adhesion, discussing the measurement of this property, and some of the factors that determine it: drying, pigmentation, moisture. In addition, he briefly reviews the technique of measurement of tensile strength, using a loading beam tensometer.[15]

Schwab and others describe a device for determining the drying time of protective coatings at elevated temperatures. This is essentially a small Sanderson dryer, built in an oven capable of maintaining heats up to 260°C. Turntables make simultaneous evaluation of 3 films possible. In the tests carried out, reproducible results were obtained with converted phenolic, melamine alkyd and epoxy phenolic resins, as well as with several poly-unsaturated fatty vinyl ether copolymers. It was noted that coatings on black iron dry faster than those on aluminum. This fact is interpreted to mean that iron is an oxidation or polymerization catalyst.[16]

Scheufele describes the erection and use of a blister "house" at one of the plants of Dewey and Almy Chemical Division. This is a framework on which test panels are mounted and within which constant temperature and high humidity are maintained. The performance of coatings under extreme conditions will be tested here, and it is anticipated that staining, grain checking, efflorescence and loss of adhesion can also be studied. Details of construction are cited.[17]

A detailed article by Koenecke deals with an electrolytic cell test developed to screen coatings used in the presence of electrical potentials. Exposure to such potentials is a frequent cause of failure in a coating, whether protective or decorative, and is particularly signifi-

cant where iron and steel are to be considered. So many factors are of importance in this connection that the author undertook a basic formulation study. Chief among the resins he studied were the Esso butadiene-styrene copolymers, "C-Oil" MD 421" and Butoxy MN-423.[18]

Measurement of paint thickness by use of the electronic method is subject of a paper in PAINT AND VARNISH PRODUCTION. Advantages of using the Dermitron (Unit Process Assemblies, Inc.) for non-destructive measurements are noted. These tests are made on paint, enamel, lacquer, and other organic coatings on aluminum, brass, magnesium, copper, zinc, and other non-magnetic metals. Principles of operation and application are discussed.[19]

Hofmann devotes a paper to problems of adhesion of latex paints to plaster under humid conditions. Acknowledging that failures of such paints on fibrous and trowelled plaster have been encountered, he investigates several pertinent questions: thickness of paint film, age of the film, adhesion at various relative humidities, effect of alternate wetting and drying, and effect of pigment/binder ratio. His experiments indicate that thickness of paint film, its age and pigment/binder ratio have no influence on adhesion as measured; on the other hand, cyclic wetting and drying decrease adhesion. Relative humidities above 90% also cause a loss of adhesion.[20]

The relative value of accelerated weathering versus external exposure in assessing paint durability is discussed by Bose and Mukerji. Their work represents a review of work done.[21]

In the *Official Digest* for November, 1960, a paper deals with the evaluation of leveling by a drawdown method.[22]

Ivanuski and Tompkins devote an article to measurement of spectral reflectivities of white paints. Data are given for white coatings in the visible and near infra-red. Specific phenomena observed during their tests are recorded and interpreted by the authors.[23]

An article by Hoffmann describes an improvement in the technique for measuring adhesion of paint films, using the Schmidt test.[24]

The procedure recommended for assessment of light fastness in the paint, printing ink and allied industries (British Standards Institution) is detailed in *Journal of the Oil and Colour Chemists' Association*.[25]

A two-part paper by James deals with the moisture-resistance of cold-cured epoxide resin paints. The first part of the paper discusses the influence of curing agents; materials, application and testing, and properties of some paints are discussed. The second part of the article is devoted to the influence of the solvent.[26]

Practical methods of measuring hiding power are reviewed by Blakey, in a paper which cites applications of the Pfund cryptometer, as well as reflectance measurements. He reports comparative results using five white paints.[27]

A laboratory "whodunit" by Soff describes phenomena accompanying the fading of mahogany varnish stain made with "oil-soluble" dye.[28]

Analysis

A very detailed paper in *Journal of the Oil and Colour Chemists' Association* (Bell) covers the application of electron microscopy to paint technology. The article surveys the results of fifteen years' work—mainly the research of the Paint Research Station. Techniques of specimen preparation are described, along with their use in gaining understanding of structure of pigment particles, emulsions, paint films, substrates, etc.[29]

Three articles in *Paint Technology* cover standardization of testing and analysis methods. The first deals with analysis of pentaerythritol, the second with the analysis of alkyd resins, and the third with testing procedures for synthetic resins.[30]

For a very extensive review of recent developments in analytical techniques, many of them applicable to the coatings industry, the reader's attention is called to the April, 1960, issue of *Analytical Chemistry*.[31]

The volumetric determination of isophthalic and other dicarboxylic acids in modified alkyd resins is subject of a paper by Espositio and Swann. The method involves non-aqueous titration. The authors note that the gravimetric methods are unsuitable for measuring isophthalic acid, and are rarely adaptable to modified alkyd resins of any kind. The volumetric method is faster than the ultraviolet method, and requires no special equipment.[32]

Clark and Farrell devote a paper to a modified technique for the isolation of surface films using the alcoholic iodine method.[33]

Dannenberg and others discuss infrared spectroscopy of surface coatings in reflected light; the method has been applied to organic coatings on metal substrates, using a commercial spectrophotometer with special reflectance accessory. The authors conclude that the technique is useful for qualitative and semiquantitative work.[34]

A short paper by Esposito is devoted to methods of analysis for dichlorosulfonated polyethylene two package coating systems. These include a qualitative test for chlorosulfonated polyethylene and a quantitative determination of sulfur and chlorine.[35]

Esposito and Swann describe a process for the determination of chlorendic acid in fire-retardant paints; the method involves the isolation of the acid as the dipotassium salt by saponification in isopropyl alcohol, followed by acid treatment and extraction of the chlorendic acid with ethyl ether, washing free of other organic acids with water, and titrating in an nonaqueous medium.[36]

An article by Poxon discusses the application of the outline area index method of filter paper chromatography to the study of oils containing free fatty acid. Results of the study are said to show that the index is sensitive to the presence of free acid, and probably to the presence of any polar compound in an oil.[37]

Rischbieth writes about the "soluble lead" content of lead chromes. His paper emphasizes the point that existing theories that explain the effect of this content on lead chrome pigments, when they are admixed with other pigments, are inadequate; based on a technical study of his own, he advances some general principles governing the

solubility properties of the chromes.[38]

Hall and McNutt have a paper on the polarographic determination of terephthalic acid mixtures of phthalic acid isomers.[39]

The gravimetric estimation of the density of pigments, using a pycnometer, is subject of a paper by Rehacek.[40]

Krzaminski describes the applications of gas chromatographic techniques for solvent analysis.[41]

Rheology

Practically the entire May, 1960, issue of the *Official Digest* is devoted to a symposium on the viscosity and flow properties of paints. Since the total symposium includes the work of 18 authors, it will be best here to summarize the subjects dealt with, and to refer the reader to the issue itself for full coverage. In the symposium, definitions and problems of flow measurement are dealt with in detail—with particular emphasis on how the problems are treated in the paper, ink, paint, adhesives, and plastics industries. Following this is a technical discussion of how flow properties affect production and how they affect application. In conclusion, a number of papers deal with flow control additives: thickeners and surface active agents.[42]

McKennell devotes a paper to a discussion of recent developments in paint viscometry. His article deals with questions of viscometer design, rotational viscometers, rheological considerations, control of paint thinning, etc. Two of the instruments he deals with are the Ferranti portable viscometer and the Ferranti-Shirley cone and plate viscometer.[43]

A paper by Baranyai covers a method for calculating the viscosities of alkyd solutions. The theory applied here is based on a comparison of ideal and actual behaviors; in his article, Baranyai introduces three new terms: ideal solids, ideal logarithmic viscosity number, and viscosity factors. Detailed tables show the difference between determined and calculated viscosities for different types of alkyd solution.[44]

Mell goes into the subject of rheological measurements in the paint industry. Primarily his article discusses instruments useful in measuring changes in viscosity of paint systems at different rates of shear.[45]

Lock writes about flotation and flooding in paints; he reviews some theories, and discusses the important part played by vehicle. His work included a study of these phenomena in titanium dioxide with synthetic yellow oxide, lamp black, phthalocyanine blue, and Prussian blue in five alkyds of differing acid and hydroxyl values.[46]

Paint Technology reprints a paper by Maddock, dealing with the testing of thixotropic paint. In particular, the author discusses results obtained using a modification of the Krebs Stormer viscometer, which enables viscosity measurements to be made at high shear rates—up to 3000 sec.-1 [47]

A very useful "Guide to industrial viscometry" (Bates) tabulates some 56 viscosity measuring devices and 17 units, including those applicable in the paint and coatings industries.[48]

A paper by Baranyai reviews techniques of calculating the viscosities of binary systems.[49]

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Cleveland 15, Ohio

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1645 S. Kilbourn Ave.
Chicago 23, Ill.

★**MEARL CORP.** (7)
41 E. 42nd St.
New York 17, N. Y.

Merck Marine Magnesium Div. (1,5,7)
126 E. Lincoln Ave.
Rahway, N. J.

Mercury Chemical Corp. (1,5,8,10)
U. S. Highway 1
Edison, N. J.

Mercury Handling Systems (12)
44 Water St.
Pearl River, N. Y.

Metalead Products Corp. (7)
2901 Park Blvd.
Palo Alto, (A), Calif.

Metal & Thermit Corp. (1)
Rahway, N. J.

Metals Disintegrating Co., Inc. (7)
P. O. Box 290
Elizabeth (B), N. J.

Metalsalts Corp. (1)
200 Wagaraw Rd.
Hawthorne, N. J.

★**METASAP CHEMICALS CO. Div. of Nopco Chemical** (1)
Langdon and Potter Sts.
Harrison, N. J.

★**MICROBEADS, INC.** (1)
P. O. Box 241
Jackson, Miss.

Micronized Metals, Inc. (7)
38-13 - 10th St.
Long Island City, N. Y.

Midwest Synthetics Co. (9)
200 Sayre Sts.
Rockford, Ill.

Franklin P. Miller & Sons, Inc. (11)
36 Meadow St.
East Orange 13, N. J.

George A. Milton Can Co., Inc. (13)
131-151 N. 14th St.
Brooklyn 11, N. Y.

Mineral Pigments Corp. (7)
Washington Blvd.
Muirkirk, Md.

★**MINERALS & CHEMICALS PHILLIP CORP. OF AMERICA** (1,7)
Essex Turnpike
Menlo Park, N. J.

★**MINNESOTA LINSEED OIL CO.** (3)
25 - 44th Avenue N. E.
Minneapolis 21, Minn.

Mixing Equipment Co., Inc. (11)
135 Mt. Read Blvd.
P. O. Box 1370
Rochester 3, N. Y.

Mobay Chemical Co. (9)
Penn Lincoln Pkway West
Pittsburgh 5, Pa.

Mobile Oil Co. (1,5,10)
150 East 42nd St.
New York 17, N. Y.

Modern Solvent & Chemical Corp. (5,10)
State St.
Perth Amboy, N. J.

Mona Industries, Inc. (1)
65-75 E. 23rd St., P. O. Box 1786
Paterson 17, N. J.

★**MONSANTO CHEMICAL CO.** (1,6,9)
Plastics Div.
Springfield 2, Mass.

Monsanto Chemical Co. (1,7)
Organic, Inorganic Chemicals Div.
800 North Lindbergh Blvd.
St. Louis 66, Missouri

Mooney Chemicals, Inc. (2)
2271 Scranton Rd.
Cleveland 13, Ohio

Mooney Machine Mfg. Co. (11)
4925 Cecelia St.
Bell, Calif.

★**MOREHOUSE-COWLES, INC.** (11)
1156 San Fernando Rd.
Los Angeles 65, Calif.

Morest Co. (14)
211 Center St.
New York 13, N. Y.

Morningstar-Paisley, Inc. (1,6)
630 W. 51st St.
New York 19, N. Y.

N

Naftone, Inc. (1,2,5,6,9)
425 Park Ave.
New York 22, N. Y.

National Aniline Div. (1,5,9,10)
Allied Chemical Corp.
40 Rector St.
New York 6, N. Y.

National Can Co. (13)
3217 W. 47th St.
Chicago 32, Ill.

National Lead Co. (1,3,7)
111 Broadway
New York 6, N. Y.

National Lead Co. (7)
DeLore Div.
River Des Peres & S. Broadway
St. Louis 11, Mo.

★**NATIONAL STARCH AND CHEMICAL CORP.** (6)
750 Third Ave.
New York 17, N. Y.

National Steel Container Corp. (13)
6700 S. Leclaire Ave.
Chicago 38, Ill.

Naugatuck Chemical (5,6,9)
Div. of U. S. Rubber Co.
Elm Street
Naugatuck, Conn.

Nelio Resins Inc. (5,9)
2051 Love Avenue
Jacksonville, Florida

Neptune Meter Co. (11)
Liquid Meter Div.
47-25 - 34th St.
Long Island City, N. Y.

Neumann and Weaver, Inc. (11)
22-12 Raphael St., P. O. Box 523
Fairlawn, N. J.

Neville Chemical Co. (1,9,10)
Neville Island
Pittsburgh 25, Pa.

The New Jersey Zinc Co. (7)
160 Front St.
New York 38, N. Y.

Newport Industries Co., (1,3,5,10)
Div. of Heyden-Newport Chemical Corp.
342 Madison Ave.
New York 17, N. Y.

Nitrogen Div. (5)
Allied Chemicals Corp.
40 Rector St.
New York 6, N. Y.

★**NOPCO CHEMICAL CO.** (1,5)
60 Park Pl.
Newark 1, N. J.

Norcross Corp. (14)
247 Newtonville Ave.
Newton 58, Mass.

Northern Pigment Co. Limited (7)
Towns Rd., P. O. Box 1
New Toronto, Ontario, Canada

★**NUODEX PRODUCTS CO., INC.** (1,2)
Div. of Heyden-Newport Chemical Corp.
Elizabeth, N. J.

O

★**OHIO KILNS** (11)
Granville, Ohio

Oil Equipment Labs, Inc. (11)
600 Pearl St.
Elizabeth 4, N. J.

Olin Mathelson Chemical Corp. (1,5,9,10)
745 Fifth Ave.
New York 22, N. Y.

Onyx Chemical Corp. (1,4,9)
190 Warren St.
Jersey City, N. J.

Oronite Division Chemical Co. (1,2,5)
200 Bush St.
San Francisco 20, Calif.

C. J. Osborn Co. (7,9)
1301 West Blanche St.
Linden, N. J.

P

★**PACIFIC VEGETABLE OIL CORP.** (3,4)
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1145 S. 10th St.
Richmond, Calif.

Harold L. Palmer Co. (11)
28625 Grand River Ave.
Farmington, Mich.

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59 Beekman St.
New York 38, N. Y.

Partlow Corp. (14)
239 Campion Road
New Hartford, N. Y.

Patent Chemicals & Synthetic Chemicals Div. (1)
335 McLean Blvd.
Paterson, N. J.

Patterson Foundry & Machine Co. (11)
Div. of International Process Equipment Co.
1250 St. George St.
East Liverpool, Ohio

The Patterson-Kelly Co. Inc. (11)
Warren St.
East Stroudsburg, Pa.

The Pennebacker Co. (11)
Third & Furnace Sts.
Emmaus, Pa.

Pennsylvania Color & Chemical Co. (7)
Pine Run Rd.
Doylestown, Pa.

★**PENN. IND. CHEM. CORP.** (1,5,6,9)
120 State St.
Clairton, Pa.

Pensalt Chemicals Corp. (1,10)
3 Penn Center
Philadelphia 2, Pa.

Perfection Varnish Co. (6)
2829 James St.
Fort Wayne, Ind.

★**D. J. PETERSON** (11)
Box 181F
Sheboygen, Wis.

Petrometer Corp. (11)
43-22 Tenth St.
Long Island City 1, N. Y.

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A Div. of Pfaudler Permutit, Inc.
1000 West Ave.
Rochester 3, N. Y.

Pfister Chemical Wks., Inc. (1)
Linden Ave.
Ridgefield, N. J.

Chas. Pfizer & Co. Inc. (1,5)
630 Flushing Ave.
Brooklyn 21, N. Y.

Philadelphia Quartz Co. (1,7)
1146 Q Public Ledger Bldg.
Philadelphia 6, Pa.

Phillips Associates (11)
6003 Market
Oakland 8, Calif.

★**PHILLIPS PETROLEUM CO.** (10)
Special Product Div.
Bartlesville, Okla.

★**PHOTOVOLT CORP.** (14)
95 Madison Ave.
New York 16, N. Y.

Pittsburgh Coke & Chemical Co. (5,7,8,9,10)
Industrial Chemical Div.
2000 Grant Bldg.
Pittsburgh 19, Pa.

Polak & Schwartz, Inc. (1)
667 Washington St.
New York 14, N. Y.

Porcelain Div. Ferro Corp. (11)
P. O. Box 358-A
East Liverpool, Ohio

Potters Brothers, Inc. (1)
Industrial Rd., P. O. Box 14
Carlstadt, N. J.

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Dayton 2, Ohio

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Valley Park, Mo.
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Elizabeth, N. J.
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Ft. Wayne, Ind.
Protectoseal Co. (11,12)
1920 S. Western Ave.
Chicago 8, Ill.
Publicker Industries Inc. (10)
1429 Walnut St.
Philadelphia 2, Pa.

R

★**RADIANT COLOR CO.** (7)
830 Isabella St.
Oakland 7, Calif.
The Rapids-Standard Co., Inc. (12)
Rapistan Bldg.
Grand Rapids 2, Michigan
★**RAYBO CHEMICAL CO.** (1)
P. O. Box 2155
Huntington 18, W. Va.
Read Standard—Div. of Capitol Products Corp. (11,12)
York, Pa.
Reichard-Coulston, Inc. (7)
15 E. 26th St.
New York 10, N. Y.
★**REICHHOLD CHEMICALS, INC.** (1,5,6,7,9)
525 N. Broadway
White Plains, N. Y.
Reliable Strainer Mfg. Co. (11)
1725 N. Eastern Ave.
Los Angeles 32, Calif.
Revolvator Co. (12)
2000 - 86th St.
North Bergen, N. J.
Reynolds Metals Co. (7)
P. O. Box 2346
Richmond 1, Va.
Rheem Manufacturing Co. (13)
1701 West Edgar Rd.
Linden, N. J.
Rhodia, Inc. (1,7)
60 E. 56th St.
New York 22, N. Y.
Rietz Mfg. Co. (11)
150 Todd Rd.
Santa Rosa, Calif.
Rohm & Haas Co. (1,6,9)
Washington Square
Philadelphia 5, Pa.
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A Div. of Rona Laboratories, Inc.
E. 21st & E. 22nd Sts.
Bayonne, N. J.
Charles Ross & Son Co. (11)
148-156 Classon Ave.
Brooklyn 5, N. Y.
Ross & Rowe (1)
50 Church St.
New York 7, N. Y.

S

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Bucks County, Pa.
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Lake Ave.
Elyria, Ohio
Selas Corp. of America (11)
Dresher, Pa.
Semet-Solvay Petrochemical Div. (1)
Allied Chemical Corp.
40 Rector St.
New York 6, N. Y.
Shar Dispersion Equipment Co. Inc. (11)
2829 James St.
Ft. Wayne 5, Ind.
Shawinigan Resins Corp. (6,9)
644 Monsanto Ave., P. O. Box 2130
Springfield 1, Mass.
Shell Chemical Corp. (1,5,9,10)
50 W. 50th St.
New York 20, N. Y.
Shell Oil Co. (1,10)
50 W. 50th St.
New York 20, N. Y.
The Shepherd Chemical Co. (1,2,7)
2803 Highland Ave.
Cincinnati 12, Ohio
Sherwin-Williams Co. (2,3,5,7,8,9,10,13)
Pigment Color & Chemical Div.
260 Madison Ave.
New York 16, N. Y.
★**SIGNAL OIL & GAS CO.** (10)
Houston Div.
8938 Manchester Ave.
Houston 12, Texas
Silberline Mfg. Co., Inc. (7)
425 Fairfield Ave.
Stamford, Conn.
Sinclair Petrochemicals, Inc. (10)
600 Fifth Ave.
New York 20, N. Y.
★**SINDAR CORP.** (1,5)
321 W. 44th St.
New York 36, N. Y.
★**SKELLY OIL CO.** (10)
605 W. 47th St.
Kansas City 41, Mo.
Smith Chemical & Color Co., Inc. (1,2,7)
55 John St.
Brooklyn 1, N. Y.
J. Lee Smith & Co., Inc. (7)
P. O. Box 185
North Brunswick, N. J.
Werner G. Smith, Inc. (3)
1730 Train Ave.
Cleveland 13, Ohio
Socony Mobil Oil Co. (10)
150 E. 42nd St.
New York, N. Y.
Sohio Chemical Co. (5)
P. O. Box 628
Lima, Ohio
Sole Chemical Corp. (1)
7740 South Chicago Ave.
Chicago 19, Illinois
★**SOLVENTS & CHEMICALS GROUP** (4,5,8,10)
2540 Fluornoy St.
Chicago 12, Illinois
Southern California Minerals Co. (7)
320 S. Mission Rd.
Los Angeles 33, Calif.
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33 Rector St.
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Southern Naval Stores (5)
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Southwestern Engineering Co. (11)
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Los Angeles 58, Calif.
★**SPARKLER MANUFACTURING CO.** (11)
101 Cartwright Rd.
Conroe, Texas
Specialty Resins Co. (9)
2801 Lynwood Rd.
Lynwood, Calif.
A. E. Staley Mfg. Co. (1,3)
2200 E. Eldorado St.
Decatur 60, Ill.
Standard Oil Co. of Ohio (10)
Midland Bldg.
Cleveland, Ohio
Standard Ultramarine & Color Co. (7)
5th Ave. & 25th St.
Huntington 18, W. Va.
Stanley Doggert Inc. (7)
P. O. Box 11, 59 - 2nd St.
S. Orange, N. J.
Star-Tank & Filter Corp. (11)
875 Edgewood Road
Bronx 59, N. Y.
Stein, Hall & Co., Inc. (1,6)
285 Madison Ave.
New York 17, N. Y.
The Stepan Chemical Co. (1,5)
Edens & Winnetka
Northfield, Ill.
Sterling Fleishman Co. (12)
P. O./Box 94
Broomall, Pa.
Stern Can Co., Inc. (13)
71 Von Hillern St.
Boston 25, Mass.
Stewart-Warner Corp. (12)
182 Diversey Pkwy.
Chicago 14, Ill.
F. J. Stokes Corp. (11)
5500 Tabor Rd.
Philadelphia 20, Pa.
Fred'k A. Stresen-Reuter, Inc. (1,2,9)
400 W. Roosevelt Ave.
Bensenville, Ill.
Strobridge Lithographing Co. (15)
4530 Montgomery Rd.
Cincinnati 12, Ohio
Sun Oil Co. (1,3,10)
1608 Walnut St.
Philadelphia 3, Pa.
Swift & Co. (4,5)
1800 165th St.
Hammond, Ind.
★**SYNTHETIC CHEMICALS INC.** (1,7)
335 McLean Blvd.
Paterson 4, N. J.
Synvar Corp. (9)
Wilmington, Del.

T

Taber Instrument Co. (14)
N. Tonawanda, N. Y.
★**TAMMS INDUSTRIES, INC.** (1,7)
228 N. LaSalle St.
Chicago 1, Ill.
Tennessee Products & Chemicals Corp. (1,5,8,10)
2611 West End Ave.
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Terriss Div. (11,12,13)
Consolidated Siphon Supply Co. Inc.
22 Wooster St.
New York 13, N. Y.
The Thibaut & Walker Co., Inc. (7,9)
150 Rome St.
Newark 1, N. J.
★**TITANIUM PIGMENT CORP.** (7)
111 Broadway
New York 6, N. Y.
Townmotor Corp. (12)
1226 E. 152nd St.
Cleveland 10, Ohio
Trancoa Chemical Corp. (9)
312-326 Ash St.
Reading, Pa.
Tri-Homo Corp. (11)
90 Highland Ave.
Salem, Mass.
Trojan Powder Co. (5)
17 N. Seventh St.
Allentown, Pa.
Troy Chemical Co. (1,2)
338 Wilson Ave.
Newark 5, N. J.
Troy Div. Skinner Engine Co. (11)
337 W. 12th St.
Erie 6, Pa.

U

★**U B S CHEMICAL CO.** (6)
491 Main St.
Cambridge 42, Mass.
Union Bag-Camp Paper Corp. (3)
233 Broadway
New York 7, N. Y.
Union Carbide Plastics Co. (1,5,8,10,16)
Div. of Union Carbide Corp.
270 Park Ave.
New York 17, N. Y.
★**UNION CARBIDE PLASTICS CO.** (6,9)
Div. of Union Carbide Corp.
30 E. 42nd St.
New York 17, N. Y.
Silicone Div. (1,9)
Union Carbide Corp.
30 E. 42nd St.
New York 17, N. Y.
★**UNION PROCESS CO.** (11)
121 Ash St.
Akron 8, Ohio
Unit Process Assemblies Inc. (14)
53-15 - 37th Ave.
Woodside 77, N. Y.
U. S. Air Tool Co. (11)
799 Elmont Road
Elmont, Long Island, N. Y.
U. S. Borax (1)
630 Shotto Place
Los Angeles, Calif.
U. S. Bronze Powder Works, Inc. (7)
Route 202
Flemington, N. J.
U. S. Coatings Co. (6,9)
225 Manida St.
Bronx 59, N. Y.
★**U. S. HOFFMAN CAN CORP.** (13)
50th St. and First Ave.
Brooklyn, N. Y.
U. S. Industrial Chemicals Co. (1,5,9,10)
Div. of National Distillers & Chemical Corp.
99 Park Ave.
New York 16, N. Y.
U. S. Rubber Co. (6,9)
Naugatuck Chemical Division
Naugatuck, Conn.
U. S. Stoneware Co. (11)
12 E Ave.
Tallmadge, Ohio
United Carbon Co., Inc. (7)
410 Park Ave.
New York 22, N. Y.
United States Steel Corp. (10)
525 William Penns Pl.
Pittsburgh 30, Pa.
United States Steel Products Div. (13)
U. S. Steel Corp.
30 Rockefeller Plaza
New York 20, N. Y.
United Ultramarine & Chemical Co., Inc. (7)
189 Broadway
New York 6, N. Y.

V

Van Ameringen-Haebler (1)
Div. of International Flavors & Fragrances, Inc.
521 W. 57th St.
New York 19, N. Y.
R. T. Vanderbilt Co., Inc. (1,6,7)
230 Park Ave.
New York 17, N. Y.
Varcum Chemical Corp. (9)
Div. of Reichhold Chemicals, Inc.
P. O. Box 476
Niagara Falls, N. Y.
★**VELSICOL CHEMICAL CORP.** (1,6,9)
330 E. Grand Ave.
Chicago 11, Illinois
Verona Pharmachemical Corp. (1)
Springfield Rd.
Union, N. J.

Vickers Petroleum Co., Inc. (10)
8306 E. Central—P. O. Box 2240
Wichita 1, Kans.
Viscatone Chemical Co. (1)
Ziegler, Ill.
Vulcan Containers, Inc. (13)
P. O. Box 161
Bellwood, Ill.
★VULCAN-ASSOCIATED CONTAINER COMPANIES, INC. (13)
3075 North 35th Ave.
(P. O. Box 1510)
Birmingham, Alabama
Vulcan Containers Pacific Inc. (13)
2424 Merced St.
San Leandro, Calif.

W

Wallace & Tiernan, Inc. Harchem, Div. (3,4,8)
25 Main St.
Belleville 9, N. J.
Warwick Wax Div. of The Western Petrochemical Corp. (1)
2 West 45th St.
New York 36, N. Y.

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Chicago 9, Ill.
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Industrial Chemical Sales Div.
230 Park Ave.
New York 17, N. Y.
Western Solvents & Chemicals Co. (1,3,5,6,10)
6472 Selkirk
Detroit 24, Mich.
Wheeling Stamping Co. (13)
2116 Water St.
Wheeling, W. Va.
White Color Card Co. (15)
467 Amsterdam
Detroit 2, Mich.
Whittaker, Clark & Daniels, Inc. (1,7)
100 Church St.
New York 7, N. Y.
Wica Chemicals, Inc. (1,6)
Old Concord Rd.
Charlotte 1, N. C.
★C. K. WILLIAMS & CO. (7)
2001 Lynch Ave.
East St. Louis, Ill.
★WITCO CHEMICAL CO., INC. (1,2,5,7,8)
122 E. 42nd St.
New York 17, N. Y.
Woburn Chemical Corp. (3,4,5)
1200 Harrison Ave.
Harrison, N. J.
Wyandotte Chemicals Corp. (1,5,7)
Wyandotte, Mich.

X, Y, Z

Yale & Towne Mfg. Co. (12)
11000 Roosevelt Blvd.
Philadelphia 15, Pa.
G. S. Ziegler & Co. (1,5)
170 Great Neck Rd.
Great Neck, L. I., N. Y.
William Zinsser & Co. (9)
516 W. 59th St.
New York 19, N. Y.
Zophar Mills, Inc. (5)
112-130 26th St.
Brooklyn 32, N. Y.

CANADIAN and MEXICAN FIRM ADDRESSES

A

Allied Chemical Corp. Plastics Div.
CANADA
Allied Chemical Ltd.
1450 City Councillors St.
Montreal 2, Quebec

MEXICO
Allied Chemical International Corp.
Paseo De La Reforma 76
Officina 401
Mexico 6, D. F. Mexico

Allied Chemical Corp. National Aniline Div.
CANADA
Allied Chemical Ltd.
1450 City Councillors St.
Montreal 2, Quebec

Allied Chemical Corp. Semet-Solvay Petrochemical Div.
CANADA
Allied Chemical Ltd.
1450 City Councillors St.
Montreal 2, Quebec

MEXICO
Raw Materials S.A. de C. V.
Viena 4
D. F. Mexico

American Alcolac Corp.
CANADA
Canadian Alcolac Ltd.
2055 Mountain Street
Montreal, Quebec

American Felt Company
CANADA
E. F. Walter Limited
8225 Labarre Street, Montreal 9, Canada

Armour Industrial Chemical Co.
CANADA
Armour Industrial Chemical Company
100 University Ave.
Toronto, Ontario

MEXICO
Sociedad Commercial E. Industrial S.A.
Paseo De La Reforma No. 51-90 Piso
Mexico 1, D.F., Mexico

B

Baker Perkins, Inc.
CANADA
Canadian Baker Perkins Ltd.
Brampton, Ontario

The Borden Co.
CANADA
The Borden Chemical Co.
Box 610
West Hill
Toronto, Ontario

MEXICO
Casco Quimica DE Mexico, S.A.
Atenas 40-401
Mexico 6, D.F. Mexico

Buckman Laboratories, Inc.
CANADA
Buckman Laboratories of Canada
Suite 605 1255 Phillips Sq.
Montreal 2, P.Q.

Buhler Corp.
CANADA
Buhler Corp. (Canada) Ltd.
24 King Street West
Toronto 1, Ontario

MEXICO
Cia. Tecnica Y Mercantils, S. A.
2a Calle Dr. Vertiz No. 67
Apartado 2487
Mexico D. F.

C

Godfrey L. Cabot, Inc.
CANADA
Cabot Carbon of Canada, Ltd.
121 Richmond Street W.,
Toronto 1, Ontario

Carbola Chemical Co., Inc.
CANADA
Carbola Chemical Products, Ltd.
1410 Stanley Street
Montreal, Quebec

Carey-Canadian Mines, Ltd.
CANADA
The Philip Carey Co. Ltd.
Box 1370, Station O,
95 Stinson Blvd., V. St. Laurent
Montreal 9,

Cataphote Corporation
CANADA
Cataphote (Canada) Ltd.
P.O. Box 727
Brantford, Canada

Celanese Chemical Company, a Division of Celanese Corporation of America
CANADA
Canadian Chemical Co., Ltd.
1600 Dorchester St , West
Montreal 25, Quebec

MEXICO
Celanese Mexicana, S.A.
Plaza Santos DeGollado 10
Mexico City, D. F.

Colloids, Inc.
CANADA
Colloids of Canada Ltd.
180 St. Hubert St.
Granby, Que.

MEXICO
Colloids de Mexico, S.A. de C.V.
Pirineos 247
Mexico, D. F.

Columbian Carbon Co.
MEXICO
Columbian Carbon de Mexico
Sinaloa 32
Mexico 7, D. F., Mexico

Columbian Carbon Company Mapico Iron Oxides Unit
CANADA
Columbian Carbon (Canada), Ltd.
Carbon Black and Pigment Div.
7147 Park Avenue
Montreal 15,

Columbia-Southern Chemical Corp.
CANADA
Standard Chemical Ltd.
1010 St. Catherine St., West
Montreal, Quebec

Concord Mica Corporation
CANADA
Kingsley and Keith (Canada) Ltd.
4444 Sherbrooke St., West
Montreal, Que.

Crown Cork & Seal Co.
CANADA
Crown Cork and Seal Co. Ltd.
320 Carlaw Ave.
Toronto, Ontario

D

Daniel Products Co.
CANADA
L. V. Lomas Chemical Co., Ltd.
2437 Jane St.
R.R.2, Weston, Ont., Canada

J. H. Day Co.
CANADA
Mr. William Grobe
27619 Buckingham
Livonia, Mich.

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T. de La Pena & Hijos
Nazas 45 A Col.
Cuauhtemoc
Mexico, D. F.

Dehydag, Deutsch Hydrierwerke GmbH
CANADA
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Montreal, Quebec

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W. R. Grace & Co. of Canada Ltd.
255 La Fleur Ave.
Montreal 32, Quebec

Diamond Alkali Co.
CANADA
Harrison & Crosfield Ltd.
297 St. Paul St.
Montreal 1, Quebec

Diamonite Products Mfg. Co.
CANADA
The Pigment & Chemical Co. Ltd.
633 Decarie Blvd.
Montreal, Quebec

MEXICO
A. S. Lynch & Co.
4560 E. 50 St.
Los Angeles 58, California

The Dow Chemical Company
CANADA
Dow Chemical of Canada, Ltd.
Sarnia, Ontario

Dow Corning Corp.
CANADA
Dow Corning Silicones Ltd.
1 Tippet Road
Downsview, Ontario

MEXICO
Ing. Juan M. Vinageras
P.O. Box 20369
Mexico, D. F.

E. F. Drew & Co. Inc.
CANADA
E. F. Drew & Co. Ltd.
Ajax, Ontario

E. I. DuPont De Nemours & Co., Inc. Elastomer Chemicals Dept.
CANADA
Du Pont of Canada, Ltd.
85 Eglinton Avenue East
Toronto 85, Ontario

MEXICO
Du Pont S. A. de C. V.
Av. Jaurez 117
Mexico, D. F.

E

Elgin Mfg. Co.
CANADA
Canners Machinery Ltd.
Simcoe, Ontario

MEXICO
American Steel Export Inc.
347 Madison Avenue
New York 17, N. Y.

Emery Industries, Inc.
CANADA
Emery Industries (Canada) Ltd.
639 Nelson St.
London, Ontario

A. M. Erichsen G.M.B.H.
CANADA
J. W. Ellis Industries
80 Richmond Street East
Toronto 1, Ontario

MEXICO
Erico, S. A.
Apartado Postal 24612
Mexico 11, D. F.

F

Ferro Chemical Division
CANADA
Ferro Enamels (Canada) Ltd.
Davis Ave. (Box 37)
Oakville, Ontario

MEXICO
Ferro Enamel de Mexico, S. A.
Calle Oriente 171, Numero 450
Co. Aragon
Mexico 14, D. F.

Fischer & Porter Company
CANADA
Fischer & Porter Ltd.
2700 Jane St.
Downsview, Ont.

Fischer Scientific Co.
CANADA
Fischer Scientific Co. Ltd.
8505 Devonshire Rd.
Montreal 9, Quebec

Foster Pump Works, Inc.
CANADA
Upton, Bradeen & James, Ltd.
8760 Verville St.
Montreal 11, Quebec

The Foxboro Company
CANADA
Foxboro Company Ltd.
707 Dollard Avenue
La Salle, Quebec

MEXICO
Shultz y Cia, S. A.
Apartado Postal 28987
Mexico City, Mexico

Franklin Mineral Products Company
CANADA
The Pigment & Chemical Co. Ltd.
6333 Decarie Blvd.
Montreal 29, Quebec

Freeman Chemical Corp.
CANADA
Iroquois Industrial Chemicals
Box 1015, Cornwall
Ontario

G

Geigy Industrial Chemicals Division
CANADA
Geigy Industrial Chemicals
630 Evans Ave.
New Toronto, Ontario

General Aniline & Film Corp. Antara Chemicals & General Dyestuff Div.
CANADA
Chemical Developments of Canada, Ltd.
420 Lagauchetiere Street West
Montreal 1, Quebec

MEXICO
Anilinas y Quimicas, S. A.
Dr. Vertiz 146/Apartado Postal 1117
Mexico 7, D. F.

General Dynamics Corporation Liquid Carbonic Div.
CANADA
Liquid Carbonic Canadian Corp. Ltd.
8375 Mayrand
Montreal 9, Quebec

MEXICO
Liquid Carbonic de Mexico, S. A.
Prol. Manuel Gonzalez 3804
Col. Claveria Sur., Mexico 16, D. F.,
(Mailing Address: Apartado 9590)

General Electric Company Instrument Dept.
CANADA
Canadian General Electric Co.
940 Lansdowne Ave.
Toronto 4, Ontario

General Mills, Inc. Chemical Div.
CANADA
The Caledonia Company, Ltd.
Toronto, Ontario

MEXICO
Protex S. A. General Mills, Inc.
Tlalnepantla

Georgia Kaolin Company
CANADA
Harrisons & Crosfield Ltd.
297 St. Paul Street West
Montreal 1, Quebec

The Georgia Marble Co. Calcium Products Div.
CANADA
Van Waters & Rogers of Canada Ltd.
Industrial Chemicals Division
2625 Skeena Street
Vancouver 12, B. C.

The Glidden Co.
CANADA
St. Lawrence Chemical Co.
P.O. Box 604, Station L
Toronto, Ontario

B. F. Goodrich Chemical Company
CANADA
B. F. Goodrich Canada Ltd.
409 Weber Street West
Kitchener, Ontario

MEXICO
Geon De Mexico S. A.
Apartado Postal 26816
Mexico 14, D. F.

W. R. Grace & Co. Davison Chemical Div.
CANADA
The McArthur Chemical Co. Ltd.
1396 St. Patrick St.
Montreal 22, Quebec

Granberg Corp. Subsid. of American Meter Co., Inc.
CANADA
Canadian Meter Company Ltd.
Box 470
Milton, Ontario

A. Gross & Company
CANADA
Charles Albert Smith Ltd.
356 Eastern Ave.
Toronto 8, Ontario

MEXICO
Drogas y Productos Quimicos S. A.
Paseo De La Reforma 76
Mexico 6, D. F.

H

Hayden Mica Company, Inc.
CANADA
Prescott & Company Reg'd.
2209 Hingston Avenue
Montreal 28, Quebec

Hercules Filter Corp.
CANADA
General Filtration & Engineering Ltd.
1712 Avenue Road
Toronto 12, Ontario

Herman Hockmeyer & Co.
CANADA
L. V. Lomas Chemical Co. Ltd.
2437 Jane Street
R. R. 2
Weston, Ontario

I

Imperial Color Chemical & Paper Dept. of Hercules Powder Co. Pigment Color Div.
CANADA
Imperial Paper and Color Corp. Ltd.
P.O. Box 52
St. Johns, Quebec

International Talc Co.
CANADA
St. Lawrence Chemical Co. Ltd.
5405 Pare St.
Montreal 16, Quebec

J

Johns-Manville
CANADA
Canadian Johns-Manville Co. Ltd.
565 Lakeshore Road East
Port Credit, Ontario

MEXICO
Johns-Manville Mexicana S. A. de C. V.
Calle 3 Num. 1-B, Alce Blanco
Naucalpan, Edo de Mexico

K

Kelco Company
CANADA
Charles Tennant Co., Ltd.
34 Clayson Road
Weston, Ontario

MEXICO
Agenicias Newell, S. A.
Apartado 21003
La Fragua Num. 4-303
Mexico City, D. F.

Komline-Sanderson Engineering Corporation
CANADA
Komline-Sanderson Limited
72 Orenda Road
Brampton, Ontario

Koppers Company, Inc. Plastics Div.
CANADA
Dominion Anilines & Chemicals, Ltd.
272 Dalesford Road
Toronto 18, Ontario

L

Labelette Company
CANADA
T. C. Fenton Ltd.
Wellington at Third
Simcoe, Ontario

MEXICO
Estes Company
247 Park Ave.
New York 17, N. Y.

Lawter Chemicals
CANADA
Lawter Chemicals, (Canada) Ltd.
P.O. Box 5, Iron Street
Toronto, Ontario

The Liquidometer Corp.
CANADA
Liquidometer of Canada Ltd.
1740 Cote Vertu-P.O. Box 1251
Montreal 9, Quebec

M

Mallinckrodt Chemical Works
CANADA
Mallinckrodt Chemical Works, Ltd.
378 St. Paul Street West
Montreal 1, Quebec

Manton-Gaulin Manufacturing Company, Inc.
CANADA
Richardson Agencies Ltd.
1244 Bois Frank Blvd.
St. Laurent, Montreal, Quebec

Marbon-Chemical Division of Borg-Warner Corporation
CANADA
Dillons Chemical Company Ltd.
137 Wellington Street West
Toronto 1, Ontario

The Mearl Corp.
CANADA
Canadian Bronze Powder Works, Ltd.
355 St. James St. West
Montreal, Quebec

MEXICO
Debra, Inc.
136 Liberty St.
New York, N. Y.

Merck Marine, Magnesium Division
CANADA
Dalex Co. Ltd.
100 Floral Pkwy.
Toronto 15, Ontario

Metal & Thermit Corp.
CANADA
M & T Products of Canada, Ltd.
172 Belfield Road
Rexdale, Ontario

Metalsalts Corporation Metasol Div.
CANADA
Guardian Chem. & Eq. Co. Ltd.
P.O. Box 392 Sta. "O"
Montreal 9, Quebec

Minerals and Chemicals Philipp Corp.
CANADA
Mackenzie & Feinmann Ltd.
970 Malkin Ave.
P.O Box 2109
Vancouver 3 B.C.

MEXICO
Sanyn Cia Manufacturera Quimica, S. A.
Apartado Postal 2612
Mexico City 1, D. F.

Mixing Equipment Co. Inc.
CANADA
Greey Mixing Equipment Limited
100 Miranda Avenue
Toronto 19, Ontario

MEXICO
Oficina Tecnica de Maquinaria, S. A.
Serapio Rendon No. 125
P.O. Box 20681
Mexico 6, D. F.

Mobil Oil Company
CANADA
Imperial Oil, Ltd.
111 St. Clair Ave. West
Toronto 7, Ontario

MEXICO
Mobil Oil Co. S. A.
Apartado 22 Bis.
Mexico 1, D. F.

Monsanto Chemical Company Organic & Inorganic Chemicals Division
CANADA
Monsanto Canada Ltd.
P.O. Box 900
Montreal 3, Quebec

MEXICO
Monsanto Mexicana S. A.
Medillin 79
Mexico 7 D. F.

Mooney Machine Manufacturing Co.
CANADA
T. M. Holdsworth & Co.
1955 West 4th Ave.
Vancouver 9, B. C.

Morningstar-Paisley, Inc.
CANADA
Morningstar-Paisley of Canada Ltd.
207 Queens Quay West
Toronto, Ont.

N

National Lead Company
CANADA
Canadian Titanium Pigments Ltd.
1401 McGill College Ave.
Montreal 2, Quebec

MEXICO
Comercial Tropical, S. A.
Apartado 1002
Mexico 1, D. F.

National Lead Company De Lore Division
CANADA
Canadian Titanium Pigments, Ltd.
1401 McGill College Avenue
Montreal 2, Quebec

National Starch & Chemical Corp.
CANADA
National Starch & Chemical Co. (Canada) Ltd.
371 Wallace Ave.
Toronto, Ontario

MEXICO
National Starch & Chemical de Mexico, S.A. de C.V.
Apartado 28504
Mexico 17, D. F.

Naugatuck Chemical Div. United States Rubber Co.
CANADA
Naugatuck Chemicals
Elmira, Ontario

Neptune Meter Co.
Liquid Meter Div.
CANADA
Neptune Meters Ltd.
1430 Lake Shore Rd.
Toronto 14, Ont.

Neville Chemical Company
CANADA
Bate Chemical Corp., Ltd.
470 Bridge St.
Montreal 22, Quebec

MEXICO
Commercial Tropical, S. A.
Apartado Postal #1002
Mexico, D. F.

The New Jersey Zinc Company
CANADA
St. Lawrence Chemical Company, Ltd.
5405 Pare Street
Montreal 16, Quebec

Newport Industries Company
Div. of Heyden Newport Chemical Corp.
CANADA
Drew, Brown, Limited
5410 Ferrier Street
Montreal 9, Quebec

Nopco Chemical Co.
CANADA
Nopco Chemical (Canada) Ltd.
London, Ontario

MEXICO
Nopco Industrial S.A.
Acatl 381
Mexico 16, D. F.

Norcross Corporation
CANADA
W. J. Westaway Co. Ltd.
38 McNab Street, S.
Hamilton, Ontario

MEXICO
Brassel & Morales
P.O. Box 2064
Mexico, D. F.

P

Pacific Vegetable Oil Corp.
Industrial Div.
CANADA
B. & S. H. Thompson & Co., Ltd.
651 Notre Dame Street West
Montreal, Quebec

MEXICO
Nacional de Comercio, S.A.
Paseo De La Reforma
51, 90 Piso
Mexico 1, D. F.

Pangborn Corporation
CANADA
Pangborn Canada, Ltd.
38A Mattson Rd. (Downsview)
Toronto, Ont.

MEXICO
Abrasives David Lack, S.A.
Atenas 32
Mexico 6, D. F.

Patent Chemicals Inc. &
Synthetic Chemicals, Inc.
MEXICO
Patent Chemicals, Inc.
c/o Othon Canales V.
Edificio La Mariseala, Ave.
Hidalgo, Num. 5
Desp. 1006
Mexico 1, D. F.

The Patterson Foundry and Machine Company
CANADA
Patterson Foundry & Machine Co., Ltd.
250 Danforth Road
Toronto 13, Ontario

Pennsylvania Industrial Chemical Corporation
CANADA
Charles Tennant & Co. Ltd.
34 Clayson Rd.
Weston, Toronto

Petrometer Corporation
CANADA
Ontor, Ltd.
12 Leswyn Road
Toronto 19, Ontario

MEXICO
McClellan, S.A.
Milan #14 (Apartado Postal 1354)
Mexico 6, D. F.

The Pfaudler Co., A Div. of
Pfaudler Permutit Inc.
CANADA
Pfaudler Permutit Canada, Ltd.
206 Duchess St.
Toronto, Ont.

MEXICO
Pfaudler Permutit S.A. de C.V.
Avenida De Las Torres 1860
Mexico 15, D. F., Mexico

Chas. Pfizer & Co., Inc.
CANADA
Pfizer-Canada, Div. Pfizer Corp.
5330 Royalmount Avenue
Montreal, Quebec

MEXICO
Pfizer De Mexico, S.A.
Apartado 2317
Mexico, D. F., Mexico

Process Filters, Div. of
Bowser, Inc.
CANADA
S. F. Bowser Company, Ltd.
344 Sherman Ave., N.
Hamilton, Ontario

R

The Rapids-Standard Company, Inc.
CANADA
Rapistan Canada Ltd.
888 Dupont
Toronto, Ontario

MEXICO
Casa William Mayer, S.A.
Apartado 942
Mexico 1, D. F.

Raybo Chemical Co.
CANADA
Charles Tennant & Co. (Canada) Ltd.
34 Clayson Road
Weston, Ontario

MEXICO
Commercial Tropical
Mexico D. F.

Reichhold Chemicals, Inc.
CANADA
Reichhold Chemicals (Canada) Ltd.
1919 Wilson Avenue
Weston, Toronto 15, Ont.

MEXICO
Reichhold Chemicals de Mexico, S.A.
Calle Norte 45, #731
Col. Industrial Vallejo
Mexico City 15, D. F.

Rohm & Haas Co.
CANADA
Rohm & Haas Co. of Canada, Ltd.
2 Manse Road
West Hill, Ontario

Rona Pearl Corp. A Div. of
Rona Laboratories
CANADA
Pigment & Chemical Co., Ltd.
6333 Decarie Blvd.
Montreal, Quebec

MEXICO
C. Harry Mueller
Apartado 2100
Mexico, D. F.

Ross & Rowe, Inc.
CANADA
Canadian Lecithin Company Ltd.
4195 Dundas Street West
Toronto 18, Ontario

S

Sandoz, Inc.
Sandoz (Canada) Ltd.
220 Metropolitan Blvd.
Dorval, Quebec

MEXICO
Sandoz de Mexico, S.A.
Amores 1360, Apartado 25810
Mexico 12, D. F.

Schenectady Varnish Co., Inc.
CANADA
Schenectady Varnish Canada, Ltd.
309 Comstock Rd.
Scarborough, Ontario

MEXICO
Schenectady Varnish De Mexico, S.A.
Apartado No. 21115
Mexico 1, D. F.

Claude B. Schneible Co.
CANADA
Dace Industries, Ltd.
504 Victoria Avenue
P.O. Box 284
Windsor, Ontario

Shawinigan Resins Corp.
CANADA
Shawinigan Chemicals Ltd.
600 Dorchester St. West
Montreal, Quebec

MEXICO
Agraquium, S.A.
Salado Alvarez Num. 17-D
Mexico 8, D. F.

Shell Chemical Co.
CANADA
Shell Oil Company of Canada, Ltd.
P.O. Box 400, Terminal A
Toronto 1, Ontario

Sindar Corp.
CANADA
Givaudan Canada, Ltd.
214 Merton St.
Toronto, Quebec

Skinner Engine Co.—Troy Div.
CANADA
The A. R. Williams Machinery Co. Ltd.
373 Front Street East
Toronto, Canada

Smith Chemical & Color Co.
CANADA
Northern Pigment Co., Ltd.
P.O. Box One
New Toronto, Ontario

Southern Clays, Inc.
CANADA
St. Lawrence Chemical Co.
5405 Pare St.
Montreal, Quebec

Southwestern Engineering Co.
CANADA
SWECO Canada, Ltd. Vibro Equipment Div.
21 Jutland Road, Etobicoke
Toronto 18, Ontario

MEXICO
Equipos de Proceso, S.A.
Av. Ejercito Nacional No. 1019
Mexico 10, D. F.

Sparkler Mfg. Co.
CANADA
Sparkler International Ltd.
1115 Castlefield Avenue
Toronto, Ontario

MEXICO
Sparkler de Mexico, S. A.
Km. 17 Carretera a Tlalnepantla
Tlalnepantla, Edo, de Mexico

Standard Ultramarine & Color Co.
CANADA
The Caledonia Company Ltd.
1195 Bloor Street West
Toronto 4, Ontario

MEXICO
Color-Mex, S.A.
Marquez Sterling Num. 3
Mexico 1, D. F.

F. J. Stokes Corp.
CANADA
F. J. Stokes Co. of Canada, Ltd.
4198 Dundas St. West
Toronto 18, Ontario

T

Tamms Industries Co.
CANADA
Drew Brown Limited
50 Titan Road
Toronto, Ontario

Troy Chemical Company
CANADA
Pigment & Chemical Company
6333 Decarie Blvd.
Montreal, Quebec

U

U B S Chemical Co.
CANADA
Fraser & Davis Industrial Supplies, Ltd.
1504 Sherbrooke Street W.,
Montreal, Quebec

Union Carbide Chemicals Co.
CANADA
Union Carbide Canada, Ltd.
Chemicals & Plastics Div.
123 Eglinton Ave. East
Toronto 12, Ontario

MEXICO
Union Carbide Inter America Inc.
Calzado Mariano Escobedo No. 543
Mexico 5, D. F.

Union Carbide Corporation Silicones Division
CANADA
Union Carbide Canada Ltd.
Bakelite Div.
123 Eglinton Ave. East
Toronto 12, Ontario

MEXICO
National Cargon-Eveready, S.A.
Calzado Mariano Escobedo
No. 543 Apartado Postal 20399
Mexico 5, D. F.

United Carbon Co.
CANADA
Canadian Industries, Ltd.
Peele Bldg. P.O. Box 10
Montreal, Quebec

MEXICO
Mr. Ernesto del Valle
Ernesto de Valle y Cia, S. A.
Calle Lago, LaDoga 205
Mexico City 17, D. F.

U. S. Bronze Powders, Inc.
CANADA
Canadian Bronze Powder Works Ltd.
355 St. James Street West
Montreal, Quebec

United States Steel Corp.
CANADA
United States Steel Export Co.
1901 Royal Bank Bldg.
Toronto 1, Ontario

MEXICO
Wm. Young & Co., S.A.
Calle Cuauhtemoc 146
Mexico, D. F.

United Ultramarine & Chemical Co., Inc.
CANADA
Cyanamid of Canada, Ltd.
160 Bloor St. E.
Toronto 5, Ontario

V

Velsicol Chemical Corp.
CANADA
Velsicol International Corp., C.A.
Mr. R. Paul Suckling
1117 St. Catherine St.
Montreal 2, Quebec

Vulcan-Associated Container Companies, Inc.
CANADA
Vulcan Containers Limited
15 Bethridge Road
Rexdale (Toronto), Ontario

Vulcan Containers, Inc.
CANADA
Vulcan Containers Limited
15 Bethridge Road
Rexdale (Toronto), Ontario

W

Wallace & Tiernan, Inc. Harchem Div.
CANADA
Harchem Limited
715 Kipling Ave., South
Toronto 18, Ontario

T. F. Washburn Co.
CANADA
T. F. Washburn Canada Ltd.
48 Paddington St.
London, Ontario

Western Solvents & Chemicals Co.
CANADA
Western Solvents & Chemicals (Canada) Ltd.
1454 Crawford St.
Windsor, Ontario

Wheelabrator Corp.
CANADA
Wheelabrator Corp. of Canada
P.O. Box 490
Scarborough, Ontario

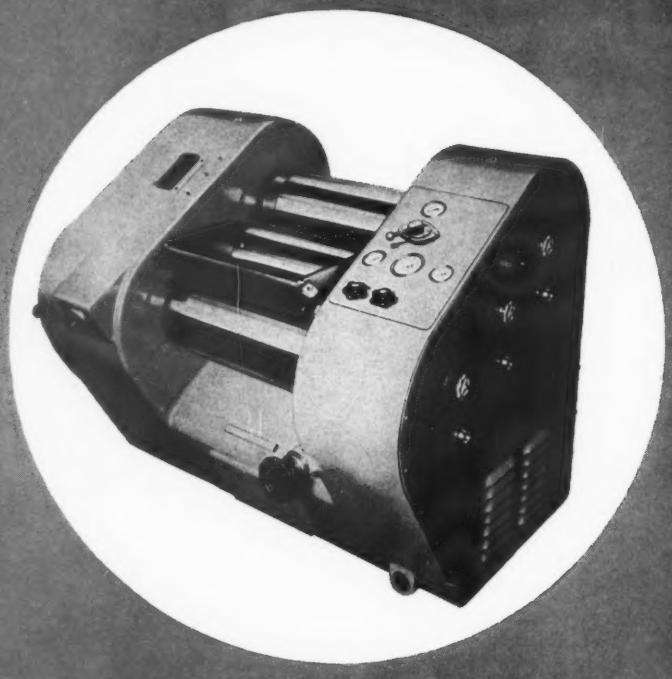
C. K. Williams & Co.
CANADA
Soden Chemical Div.
Witco Chemical Co., Canada Ltd.
2143 St. Patrick St.
Montreal, Quebec

Witco Chemical Co., Inc.
CANADA
Soden Chemical Div.
Witco Chemical Co. Canada
2143 St. Patrick St.
Montreal, Quebec

Woburn Chemical Corp.
CANADA
Bate Chemical Corp., Ltd.
470 Bridge St.
Montreal 22, Quebec

New fully hydraulic

BUHLER 3-Roll Mill



SDA
Roll Dimensions: 10" x 20"

SDT
Roll Dimensions: 16" x 32"
16" x 40"

• Up to 60% higher output

• Absolutely even pressures for uniformly fine grinding

1. New hydraulic regulating system provides absolute pressure stability and easiest (1 second) setting of rolls.

2. Determines exact pressure for any formula and duplicates it for that formula at any time.

3. Rolls disengage for cleaning in *1 second.* A simple hand-lever shift disengages rolls and scraper blade instantly. By shifting hand-lever back to operating position, rolls and scraper blade are restored to the exact pressure they were set at before disengaging.

4. New feed hopper arrangement increases working surface. Hopper cheeks do not rest on the roll, but are hydraulically pressed to the shoulder of the roll; permit grinding across the whole length of the roll, with even wear.

5. Hydraulically operated scraper blade maintains selected pressure irrespective of wear. Never loses pressure — hydraulic control takes up automatically to maintain exact selected pressure with wear.

6. Can be furnished with variable speed drive for the first roll, or driven by a 2- or 3-speed motor. Regulating the speed of the first roll for paints and inks of different consistencies increases the capacity 60% and more.

THE BUHLER CORPORATION
4207 NICOLLET AVE., MINNEAPOLIS, MINN.
SALES OFFICE: 230 PARK AVE., NEW YORK 17

BUHLER BROTHERS, (CANADA) LTD.
24 KING STREET WEST
TORONTO 1, ONTARIO

For more information circle No. 90—last page

MATERIALS AND EQUIPMENT DIRECTORY

Each product classification has been assigned a number to facilitate the reader in determining what materials and equipment are offered by those firms listed in the Suppliers of Raw Material and Equipment Directory on page 154.

ADDITIVES

I

Anti-Foaming Agents

Advance Solvent & Chemical Co. Div. of Carlisle Chemical Works Inc.
Air Reduction Chemical Co.
American Cyanamid Co. Plastics & Resins Div.
Apex Chemicals Co., Inc.
Balab
Baker Castor Oil Co.
Celanese Chemical Company, A Div. of Celanese Corp. of America
Colloids, Inc.
Commercial Solvents Corp.
Crosby Chemicals Inc.
The Dow Chemical Co.
Dow Corning Corp.
E. I. du Pont de Nemours & Co.
El Dorado Div. Foremost Food and Chemical Co.
W. H. Fales Co.
Food Machinery & Chemical Corp. Chemical & Plastics Div.
General Electric Co. Silicone Products Dept.
Glyco Products Co., Inc.
C. P. Hall Co. of Illinois
Hercules Powder Co.
Hodag Chemical Corp. Isochem
Kraft Chemical Co.
Mobile Oil Co.
Mona Industries Inc.
Monsanto Chemical Co. Organic Chemical Div.
Naftone, Inc.
Nopco Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Chas. Pfizer & Co., Inc.
Raybo Chemical Co.
Silicones Div. Union Carbide Corp.
Smith Chemical Corp.
Synthetic Chemicals Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Anti-Floating Agents

Advance Solvent & Chemical Div. of Carlisle Chemical Works Inc.
Baker Castor Oil Co.
Commercial Solvents Corp.
Dow Corning Corp.
General Electric Co. Silicone Products Dept.
Naftone Inc.
National Lead Co.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Anti-Flooding Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Lecithin Co.
Armour Industrial Chemical Co.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dow Corning Corp.
Hodag Chemical Corp.
Naftone Inc.
National Lead Co.
Raybo Chemical Co.
Silicone Div. Union Carbide Corp.
A. E. Staley Mfg. Co.
Synthetic Chemicals Inc.
Troy Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Anti-Freeze for Emulsion Paints

Olin Mathieson Chemical Corp.

Anti-Livering Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Commercial Solvents Corp.
Mona Industries, Inc.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.

Antioxidants

Eastman Chemical Co.
Koppers Co. Inc. Tar Products Div.

Anti-Sagging Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Lecithin Co. Inc.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
W. H. Fales Co.
Ferro Chemical Div.
Jones-Dabney Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
National Lead Co.
Nopco Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Raybo Chemical Co.
Ross & Rowe Inc.
Smith Chemical Color Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Anti-Settling Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Baker Castor Oil Co.
Godfrey L. Cabot Inc.
Dehydag, Deutsche Hydrierwerke GmBH
W. H. Fales Co.
Fallek Products Co.
Foremost Food & Chemical Co.
Geigy Ind. Chemical Div.
General Mills Inc. Chemical Div.
B. F. Goodrich Chemical Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Minerals & Chemicals Corp. of America
Mona Industries Inc.

Naftone, Inc.
National Lead Co.
Nopco Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Raybo Chemical Co.
Ross & Rowe Inc.
Silicone Div. of Union Carbide Co.
Synthetic Chemicals Inc.
Smith Chemical & Color Co. Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Anti-Skinning Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Aromatic Products Inc.
Commercial Solvents Corp.
Crosby Chemicals Inc.
Eastman Chemical Co.
Glidden Co. Chemical Div. Organic Chemical Dept.
Heyden-Newport Chemical Corp.
Naftone, Inc.
National Aniline Div. Allied Chemical Corp.
Neville Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Pennsalt Chemicals Corp.
Raybo Chemical Co.
The Shepherd Chemical Co.
Sindar Corp.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Western Solvents & Chemicals Co.

Bactericides

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Armour Industrial Chemical Co.
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Buckman Laboratories, Inc.
The California Ink Co., Inc.
Callery Chemical Co.
Commercial Solvents Corp.
Dianol Div. Mills Pearson Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Geigy Industrial Chemical Div.
Hilton Davis Chemical Co.
Key Chemicals Corp.
Metalsalts Corp.
Metal & Thermit Corp.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Chas. Pfizer & Co., Inc.
Sindar Corp.
Troy Chemical Co.
Union Carbide Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Witco Chemical Co.

Bodying Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co. Organic Chemical Div.
Archer-Daniels-Midland Co.
Baker Castor Oil Co.
Borden Chemical Co.
H. B. Davis Co.
Daniel Products Co.
E. I. du Pont de Nemours Co., Inc. Electrochemicals Dept.
W. H. Fales Co.
Ferro Chemical Div.
B. F. Goodrich Chemical Co.
J. M. Huber Corp.
Kelco Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Mona Industries, Inc.
Monsanto Chemical Co. Inorganic Chemical Div.
National Lead Co.
Nopco Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Philadelphia Quartz Co.
Raybo Chemical Co.
Reichhold Chemicals Inc.
Ross & Rowe, Inc.
Shawinigan Resins Corp.
Smith Chemical Color Co., Inc.
Stein, Hall & Co., Inc.
Troy Chemical Co.
Witco Chemical Co., Inc.

Carboxymethylcellulose

Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Hercules Powder Co.
H. Kohnstamm & Co., Inc.
Wyandotte Chemicals Corp.

Casein

Borden Chemical Co.
W. H. Fales Co.

Chlorinated Paraffin

R. J. Brown Co.
Central Solvents & Chemicals Co.
Commercial Solvents Co.
Diamond Alkali Co.
Hercules Powder Co.
Hooker Chemical Co.
Koppers Co. Inc. Tar Products Div.
Union Carbide Plastics Co.
Western Solvents & Chemicals Co.

Corrosion Inhibitor

Air Reduction Chemical Co.
Amchem Products, Inc.
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Armour Industrial Chemical Co.
Borden Chemical Co.
The California Ink Co., Inc.
The Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Enjay Co., Inc.
Geigy Industrial & Chemical Div.
General Mills, Chemical Div.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
Kolker Chemical Corp.
Koppers Co. Inc. Tar Products, Inc.
Nopco Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Synthetic Chemicals, Inc.
Raybo Chemical Co.
Solvay Process Div. Allied Chemical Corp.
Tennessee Products & Chemical Corp.
Union Carbide Chemical Co.
U. S. Borax
Western Solvents & Chemical Corp.
Wyandotte Chemicals Corp.

Curing Agents

American Cyanamid Co. Plastics & Resins Div.
Anderson Chemical Co.
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
General Mills, Inc. Chemical Div.
Harshaw Chemical Co.
Hooker Chemical Corp.
Hercules Powder Co.
Jones-Dabney Co.
Monsanto Chemical Co. Inorganic Chemicals Div.
Allied Chemical Corp. National Aniline Div.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Pennsalt Chemical Corp.
Reichhold Chemical Inc.
Synthetic Chemicals, Inc.

Deodorants

Aromatic Products Inc.
Godfrey L. Cabot Inc.
Dodge & Olcott
Dow Chemical Co.
Fritsche Bros.
Onyx Chemical Corp.
Polak & Schwartz, Inc.
Rhodia, Inc.
Sindar Corp.
van Ameringen-Haebler, Inc. Div. of Internat'l Flavors & Fragrances, Inc.

Dispersing Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works Inc.
Air Reduction Chemical Co.
American Cyanamid Co. Organic Chemical Div.
Antara Chemicals, Co. A Sales Div. General Aniline & Film Corp.
Apex Chemical Corp.
Armour Industrial Chemical Co.
Atlantic Refinery Co.
Atlas Powder Co.
Baker Castor Oil Co.
Borden Chemical Co.
The California Ink Company, Inc

Colloids, Inc.
Crosby Chemicals Inc.
Daniel Products Co.
Deutsche Hydriewerke GmBH
Dehydag
Dewey and Almy Chemical Div. W. R. Grace & Co.
Dow Chemical Co.
E. F. Drew Co., Inc.
E. I. du Pont de Nemours & Co. Electrochemicals Dept.
Fallek Products Co.
Farnow, Inc.
Foremost Food & Chemical Co. El Dorado Div.
Geigy Corp. Industrial Chemical Div.
General Mills, Chemical Div.
Glyco Products Co.
B. F. Goodrich Chemical Co.
C. P. Hall & Co. of Illinois
Harshaw Chemical Co.
Hercules Powder Co.
Hodag Chemical Corp.
Hooker Chemical Corp.
J. M. Huber Corp.
Johns Manville
Mona Industries, Inc.
Morningstar-Paisley Inc.
Naftone, Inc.
National Aniline Div. Allied Chemical Corp.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Oronite Chemical Co.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Rohm & Haas Co.
Ross & Rowe Inc.
Silicone Div. Union Carbide Co.
Smith Chemical and Color, Inc.
Sole Chemical Co.
A. F. Staley Mfg. Co.
Stepan Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
R. T. Vanderbilt Co.
Verona Pharmachemical Corp.
Western Solvents & Chemicals Co.
Wica Chemicals Inc.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Dyes for Stains

General Dyestuff Co. A Sales Div. of General Aniline & Film Corp.
Hilton Davis Chemical Co.
H. Kohnstamm & Co., Inc.
National Aniline Div. Allied Chemical Corp.
Sandoz, Inc.
Synthetic Chemicals, Inc.
Verona Pharmachemical Corp.

Emulsifiers

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Air Reduction Chemical Co.
American Alcolac Corp.
American Cyanamid Co., Organic Chemical Div.
American Lecithin Co., Inc.
Antara Chemicals Co. Sales Div. General Aniline & Film Corp.
Apex Chemical Co. Inc.
Armour Industrial Chemical Co.
Atlantic Refining Co.
Atlas Powder Co.
Baker Castor Oil Co.
Borden Chemical Co.
Bryton Chemical Co.
Central Solvents and Chemicals Co.
Colloids, Inc.
Commercial Solvents Corp.
Deutsche Hydrierwerke GmBH
Dehydag
Dow Chemical Co.
E. F. Drew & Co., Inc.
E. I. du Pont de Nemours & Co. Inc. Electrochemicals Dept.
W. H. Fales Co.
Fallek Products Co.
Foremost Food and Chemical Co.
Geigy Corp. Industrial Chemical Div.
General Mills Inc. Chemical Div.
Glyco Products Co.
B. F. Goodrich Co.
C. P. Hall of Illinois
Hercules Powder Co.
Hodag Chemical Corp.
Kraft Chemical Co.
Kelco Company
Mona Industries
Morningstar-Paisley, Inc.
National Aniline Div. Allied Chemical Corp.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Riechhold Chemical, Inc.
Rohm & Haas Co.
Ross & Rowe
Sole Chemical Corp.
Smith Chemical & Color Co.
A. E. Staley Mfg. Co.
Stein, Hall & Co., Inc.
Stepan Chemical Co.
Synthetic Chemicals Co.
Troy Chemical Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.
West Virginia Pulp & Paper Industrial Chemical Sales Div.
Wica Chemicals Inc.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Esterified Shellac

Acme Shellac Products Co.
Mantrose Corp.

Flatting Agents

American Cyanamid Co. Plastics & Resins Div.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
Carbola Chemical Co., Inc.
Daniel Products Co.
Davison Chemical Co., Div. of W. R. Grace & Co.
Dicalite Div. Great Lakes Carbon Corp.
English Mica Co.
Great Lakes Carbon Corp. Mining & Mineral Products Div.
Glyco Products Co.
J. M. Huber Corp.
Jones-Dabney Co. Div. Devoe & Raynolds Co. Inc.
Johns-Manville Sales Corp.
Mallinckrodt Chemical Works
Monsanto Chemical Co. Inorganic Chemical Div.
Nopco Chemical Co.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Philadelphia Quartz Co.
Semet-Solvay Petrochemical Div. Allied Chemical Corp.
The Shepherd Chemical Co.
Smith Chemical and Color, Inc.
Tamms Industries Co.
Tennessee Products & Chemical Corp.
Troy Chemical Co.
Whittaker, Clark & Daniels, Inc.
Witco Chemical Co., Inc.

Flame Retarders

Metal & Thermit Corp.
Monsanto Chemical Co. Organic Chem. Div.

Flow Controlling Agents

Baker Castor Oil Co.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
Daniel Products Co.
Dow Corning Corp.
Ferro Chemical Div.
General Electric Co. Silicone Products Dept.
B. F. Goodrich Chemical Co.
Hodag Chemical Corp.
J. M. Huber Corp.
Jones-Dabney Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Mona Industries, Inc.
Monsanto Chemical Co. Organic Chemical Div.
National Lead Co.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
M. W. Parsons-Plymouth Inc.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Fungicides

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemicals Co., A Sales Div., General Aniline & Film Corp.

Borden Chemical Co.
Buckman Laboratories, Inc.
The California Ink Co., Inc.
Callery Chemical Co.
Carbola Chemical Co., Inc.
Commercial Solvents Corp.
Celanese Chemical Co.
Denton Edwards Ltd.
Dianol Div. Mills Pearson Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Ferro Chemical Div.
Geigy Industrial & Chemical Div.
Harshaw Chemical Co.
Heyden-Newport Chemical Corp.
Key Chemicals, Inc.
Mallinckrodt Chemical Works
Metalsalts Corp.
Metal & Thermit Corp.
Naftone, Inc.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Oronite Chemical Co.
Pennsalt Chemical Corp.
Pfister Chemical Wks., Inc.
Chas. Pfizer & Co., Inc.
Scientific Oil Compounding Co.
Shepherd Chemical Co.
Sindar Corp.
Smith Chemical & Color Co.
Fred'k A. Stresen-Reuter, Inc.
Troy Chemical Co.
R. T. Vanderbilt Co.
Union Carbide Chemical Co.
Western Solvents & Chemical Co.
Witco Chemical Co., Inc.

Gloss Improver

Baker Castor Oil Co.
Dow Corning Corp.
Monsanto Chemical Co. Organic Chemical Div.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Raybo Chemical Co.
Troy Chemical Co.
R. T. Vanderbilt Co.

Grinding Aids

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Archer-Daniels-Midland Co.
Armour Industrial Chemical Co.
Baker Castor Oil Co.
Crosby Chemicals Inc.
Daniels Products Co.
Dow Corning Corp.
W. H. Fales Co.
General Aniline & Film Corp.
C. P. Hall of Illinois
Mona Industries Inc.
Monsanto Chemical Co. Organic Chemical Div.
Naftone, Inc.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Raybo Chemical Co.
Ross & Rowe, Inc.
Synthetic Chemicals, Inc.
Tamms Industries Co.
Troy Chemical Co.
Wyandotte Chemicals Corp.

Inhibitors

Amchem Products, Inc.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Borden Chemical Co.
Bryton Chemical Co.
Commercial Solvents Inc.
Eastman Chemical Products
Enjay Co., Inc.
Monsanto Chemical Co., Inorganic Chemicals Div.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.

Insecticides for Paint

Dianol Div., Mills-Pearson Corp.

Latex Additives

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Cyanamid Co. Plastics and Resins Div.
Archer-Daniels-Midland Co.
Armour Industrial Chemical Co.
Baker Castor Oil Co.
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
W. H. Fales Co.
Farnow, Inc.
Goodyear Tire and Rubber Co. Chemical Div.
C. P. Hall of Illinois
Mona Industries, Inc.
Monsanto Chemical Co. Plastics Div.
Monsanto Chemical Co. Inorganic Chemicals Div.
Mobil Oil Co.
Naftone, Inc.
Newport Industries Co., A Div. of Heyden-Newport Chemical Corp.
Nopco Chemical Co. A Div. of Heyden-Newport Chemical Corp.
Nuodex Products Co. A Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Pennsylvania Industrial Chemical Corp.
Raybo Chemical Co.
Reichhold Chemical Inc.
Rohm & Haas Co.
Stepan Chemical Co.
Troy Chemical Co.
U. S. Borax
T. F. Washburn Co.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.
Witco Chemical Co., Inc.

Lecithin

American Lecithin Co., Inc.
Archer-Daniels-Midland Co.
The Buckeye Cotton Oil Co.
W. H. Fales Co.
Naftone, Inc.
Spencer-Kellogg & Sons, Inc.
A. E. Staley Mfg. Co.
Ross & Rowe, Inc.
Smith Chemical and Color Co., Inc.

Marproofing Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works Inc.
Godfrey L. Cabot, Inc.
Daniel Products Co.
Dow Corning Co.
Nopco Chemical Co.
Raybo Chemical Co.
Semet-Solvay Petrochemical Div. Allied Chemical Corp.

Masking Agents

Aromatic Product Co.
Dow Chemical Co.
Monsanto Chemical Co. Organic Chemical Div.
Polak & Schwarz, Inc.
Rhodia, Inc.
Sindar Corp.
Western Solvents & Chemicals Co.
van Ameringen-Haebler, Inc. Div. of Internat'l Flavors & Fragrances Inc.

Masonry Water Repellents

Borden Chemical Co.
Farnow, Inc.
General Electric Co., Silicone Products Dept.
Mallinckrodt Chemical Works
Nopco Chemical Co.
M. W. Parsons Plymouth, Inc.
Pennsylvania Industrial Chemical Corp.
Silicone Div. Union Carbide Corp.
Smith Chemical & Color Co.

Metal Cleaners

Amchem Products, Inc.
Central Solvents and Chemicals Co.
Chemical Solvents Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Geigy Industrial & Chemical Div.
Mobil Oil Co.
Mona Industries, Inc.
National Aniline Div., Allied Chemical Corp.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Pennsalt Chemical Corp.
Pfister Chemical Works, Inc.
Union Carbide Chemical Co.
U. S. Borax
Western Solvents & Chemicals Co.
Wica Chemicals Inc.
Wyandotte Chemicals Corp.
Zophar Mills, Inc.

Mildewcides

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemicals Co., A Sales Div. of General Aniline & Film Corp.

Buckman Laboratories, Inc.
Celanese Chemical Co., A Div. of Celanese Corp. of America
Diamond Div., Mills-Pearson Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Ferro Chemical Div.
Geigy Industrial & Chemical Div.
Key Chemicals Corp.
Mallinckrodt Chemical Works
Metal & Thermit Corp.
Naftone, Inc.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Pfister Chemical Wks., Inc.
Shepherd Chemical Co.
Sindar Corp.
Troy Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.

Odorants

Aromatic Products, Inc.
California Chemical Co.
Dodge & Olcott, Inc.
Fritzsche Bros.
H. Kohnstamm & Co., Inc.
Onyx Chemical Corp.
Polak & Schwarz, Inc.
Rhodia, Inc.
Sindar Corp.
van Ameringen-Haebler, Inc. Div. of Internat'l Flavors & Fragrances, Inc.
Verona Pharmachemical Co.

Paint Remover Ingredients

Allied Chemical Corp. Plastics Div.
American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
Antara Chemicals, Sales Div. General Aniline & Film Corp.
Borden Chemical Co.
R. J. Brown Co.
Celanese Chemical Co.
Central Solvents & Chemicals Co.
Chemical Solvents, Inc.
Colton Chemical Co., Div. of Air Reduction Co., Inc.
Commercial Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc. Electrochemicals Dept.
Eastman Chemical Products
Kolker Chemicals Corp.
Leonard Refineries Inc.
Mallinckrodt Chemical Works
Mercury Chemical Corp.
Mobil Oil Co.
National Aniline Div., Allied Chemical Corp.
Neville Chemical Co.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Pennsalt Chemical Corp.
Chas. Pfizer Co., Inc.
Plastics Div., Allied Chemical Corp.
Semet-Solvay Petrochemical Div.
Shell Chemical Corp.
Union Carbide Chemical Co.
Velsicol Chem. Corp.
Western Solvents & Chemicals Co.
West Virginia Pulp & Paper Industrial Chemical Sales Div.

Phosphate Coatings

Amchem Products, Inc.
E. I. du Pont de Nemours & Co., Inc., Electrochemical Dept.
Metalsalts Corp.
Pennsalt Chemical Corp.
U. S. Industrial Chemicals Co., Div. of Nat'l Distillers and Chem. Corp.

Preservatives

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Allied Chemical Corp. Plastics Div.
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Borden Chemical Co.
Bryton Chemical Co.
Buckman Laboratories, Inc.
California Ink Co., Inc.
Dow Chemical Co.
Ferro Chemical Div.
Heyden-Newport Chemical Corp.
Key Chemical Corp.
Naftone, Inc.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Chas. Pfizer & Co., Inc.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Sindar Corp.
Troy Chemical Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.

Protective Colloids

Air Reduction Chemical Co.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept.
W. H. Fales Co.
Hercules Powder Co.
Inerto Co.
Kelco Co.
H. Kohnstamm & Co., Inc.
Mona Industries Inc.
Monsanto Chemical Co., Plastics Div.
Ross & Rowe, Inc.
Shawinigan Resins Corp.
A. E. Staley Mfg. Co.
Troy Chemical Co.

Puffing Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Labs., Div. of Reichhold Chemicals, Inc.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
H. B. Davis Co.
W. H. Fales Co.
National Lead Co.
Olin Mathieson Chemical Corp.
Raybo Chemical Co.
Ross & Rowe Inc.
Troy Chemical Co.

Reflective Spheres

Atlantic Powdered Metals Inc.
Cataphote Corp.
Flex-O-Lite Mfg. Co.
Microbeads, Inc.
Potter Bros. Inc.

Sanitizing Agents

Armour Industrial Chemical Co.
Buckman Laboratories, Inc.
Denton Edwards, Ltd.
Dow Chemical Co.
Geigy Industrial & Chemical Div.
Hilton Davis Chemical Co.
Monsanto Chemical Co. Inorganic Chemicals Div.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Sindar Corp.
Troy Chemical Co.
R. T. Vanderbilt Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Shingle Stain Oil

Koppers Co. Inc., Tar Products Div.
Neville Chemical Co.
Penna. Ind. Chem. Corp.
Plastics Div., Allied Chemical Corp.

Stabilizers

Advance Solvents & Chemicals Div., of Carlisle Chemical Works, Inc.
American Cyanamid Co., Organic Chemical Div.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Argus Chemical Corp.
Armour Industrial Chemical Co.
Borden Chemical Co.
Crosby Chemicals Inc.
Godfrey L. Cabot, Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc., Electrochemical Dept.
Eastman Chemical Products
Fallek Products Co.
Ferro Chemical Div.
Geigy Industrial & Chemical Div.
C. P. Hall of Illinois
Harshaw Chemical Co.
Hercules Powder Co.
Hooker Chemical Corp.
Inerto Chemical Co.
Metal & Thermit Corp.
Mona Industries, Inc.
Monsanto Chemical Co. Inorganic Chemicals Div.
Morningstar-Paisley Inc.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.

Pennsylvania Ind. Chem. Corp.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Sindar Corp.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide & Chemical Co.
R. T. Vanderbilt Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Stearates

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Cyanamid Co. Plastics & Resins Div.
W. H. Fales Co.
Harshaw Chemical Co.
Kraft Chemical Co.
Mallinckrodt Chemical Works
Metasap Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Nopco Chemical Co.
The Shepherd Chemical Co.
Smith Chemical and Color Co., Inc.
Whittaker, Clark & Daniels, Inc.
Witco Chemical Corp.

Surface Active Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Air Reduction Chemical Co.
American Alcolac Corp.
American Cyanamid Co. Plastics & Resins Div.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Apex Chemical Co., Inc.
Archer-Daniels-Midland Co.
Armour Industrial Chemical Co.
Atlantic Refining Co.
Atlas Powder Co.
Baker Castor Oil Co.
Bryton Chemical Co.
Chemical Solvents, Inc.
Colloids, Inc.
Commercial Solvents Inc.
Continental Oil Co.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
E. F. Drew & Co., Inc.
E. I. du Pont de Nemour & Co.
W. H. Fales Co.
Fallek Products Co.
Foremost Food & Chemical Co.
Geigy Corp. Industrial Div.
General Mills, Chemical Div.
Glyco Products
C. P. Hall of Illinois
Harshaw Chemical Co.
Hercules Powder Co.
Hodag Chemical Corp.
Johns-Manville Corp.
Kraft Chemical Co.
Mona Industries, Inc.
Monsanto Chemical Co., Inorganic Chemicals Div.
Naftone, Inc.
National Aniline Div. Allied Chemical Corp.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Oronite Chemical Co.
M. W. Parsons-Plymouth, Inc.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Rohm & Haas
Ross & Rowe Inc.
Sandoz, Inc.
Silicone Div., Union Carbide Co.
Sole Chemical Corp.
A. E. Staley Mfg. Co.
Stepan Chemical Co.
Synthetic Chemicals Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Surface Preparation Chemicals

Amchem Products, Inc.
Dianol Div., Mills-Pearson Corp.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Shell Chemical Corp.
Union Carbide Chemical Co.

Suspension Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works Inc.
American Alcolac Corp.
American Cyanamid Co. Plastics & Resins Div.
Armour Industrial Chemical Co.
Baker Castor Oil Co.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
Daniel Products Co.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
Fallek Products Co.
B. F. Goodrich Chemical Co.
C. P. Hall of Ill.
Hercules Powder Co.
Inerto Chemical Co.
Johns-Manville Corp.
Kelco Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Minerals & Chemicals Philipp Corp.
Mona Industries Inc.
Morningstar-Paisley Inc.
Naftone, Inc.
National Lead Co.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Raybo Chemical Co.
Ross & Rowe Inc.
The Shepherd Chemical Co.
Stein Hall & Co., Inc.
Synthetic Chemicals, Inc.
Tamms Industries Co.
Troy Chemical Co.
Western Solvents & Chemicals Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Thickeners & Gelling Agents

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Anderson Chemical Co.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
J. S. Ayers & Co.
Baker Castor Oil Co.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept.
W. H. Fales Co.
Fallek Products Co.
Ferro Chemical Div.
General Mills Inc. Chemical Div.
B. F. Goodrich Chemical Co.
W. R. Grace & Co., Davison Chemical Div.
C. P. Hall of Illinois
Hercules Powder Co.
Inerto Chemical Co.
Kelco Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Minerals & Chemicals Corp. of America
Mona Industries, nc.
Monsanto Chemical Co. Inorganic Chemicals Div.
Monsanto Chemical Co., Plastics Div.
Morningstar-Paisley Inc.
Nopco Chemical Co.
National Lead Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Philadelphia Quartz Co.
Price Varnish Co.
Raybo Chemical Co.
Reichhold Chemicals Inc.
Rohm & Haas Co.
Shawiningan Resins Corp.
Stein, Hall & Co., Inc.
Fred'k Stresen-Reuter, Inc.
Tamms Industries, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Viscatone Chemical Co.
Western Solvents & Chemicals Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Ultraviolet Absorbers

American Cyanamid Co. Intermediate Dept.
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Buckman Laboratories, Inc.
Dow Chemical Co.
Eastman Chemical Prod. Inc.
Ferro Chemical Div.

Geigy Industrial & Chemical Div.
Heyden-Newport Chemical Corp.
National Aniline Div. Allied Chemical Corp.
Nopco Chemical Co.
Rhodia, Inc.
Sinclair Corp.
Witco Chemical Co., Inc.

Vinyl Stabilizers

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Allied Asphalt & Mineral Corp.
American Cyanamid Co. Organic Chemical Div.
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Argus Chemical Corp.
Baker Castor Oil Co.
Borden Chemical Co.
Eastman Chemical Prod. Inc.
Ferro Chemical Div.
Geigy Industrial & Chemical Div.
Harshaw Chemical Co.
Hercules Powder Co.
Hooker Chemical Corp.
Metal & Thermit Corp.
Monsanto Chemical Co., Inorganic Chemicals Div.
National Lead Co.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Reichhold Chemicals Inc.
Sherwin-Williams Co. Pigment, Color and Chemical Div.
Synthetic Chemicals, Inc.
R. T. Vanderbilt Co.
Witco Chemical Co., Inc.

Waxes

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Air Reduction Chemical Co.
Allied Asphalt & Mineral Corp.
American Mineral Spirits Co.
Armour Industrial Chemical Co.
Baker Castor Oil Co.
Bareco Wax Co., Div. of Petrolite Corp.
Borden Chemical Co.
Central Solvents Chemical Co.
Commercial Solvents Corp.
Glyco Products Co.
Eastman Chemical Products
Hodag Chemical Corp.
Mantrose Corp.
Mobil Oil Co.
Nopco Chemical Co.
Semet-Solvay, Petrochemical Div.
Shell Oil Co.
Sun Oil Co.
Union Carbide Plastics Co.
Warwick Wax Div. Western Petrochemical Corp.
T. F. Washburn Co.
Western Solvents & Chemicals Co.
Witco Chemical Co.
G. S. Ziegler & Co.
Zophar Mills Inc.

DRIERS
2

Advance Solvents & Chemicals, Div. of Carlisle Chemical Works, Inc.
California Ink Co., Inc.
Ferro Chemical Div.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
McCloskey Varnish Co.
McGeon Chemical Co.
Mooney Chemicals, Inc.
Naftone, Inc.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Oronite Chemical Co.
Shepherd Chemical Co.
Sherwin-Williams, Pigment, Color and Chemical Div.
Smith Chemical and Color Co., Inc.
Fred'k A. Stresen-Reuter, Inc.
Troy Chemical Co.
Witco Chemical Co.

Drying Accelerators

Advance Solvents & Chemicals, Div. of Carlisle Chemical Works, Inc.
Harshaw Chemical Co.
Kraft Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
The Shepherd Chemical Co.
Troy Chemical Co.
R. T. Vanderbilt & Co.
Witco Chemical Co., Inc.

DRYING OILS
3

African Wood Oil

Pacific Vegetable Oil Corp., Ind. Div.

Acidulated Oils

Pacific Vegetable Oil Corp., Ind. Div.

Castor Oils

Baker Castor Oil Co.
Brazil Oiticica Inc.
Brazilian Industrial Oils, Inc.
Degen Oil & Chemical Co.
E. F. Drew & Co., Inc.
Farnow, Inc.
Harshaw Chemical Co.
T. F. McAdam, Inc.
National Lead Co.
Pacific Vegetable Oil Corp. Ind. Div.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Spencer Kellogg & Sons, Inc.
Wallace & Tiernan, Harchem Div.
Woburn Chemical Corp.

Coconut

Cargill, Inc.
E. F. Drew & Co.
Emery Industries, Inc.
Glidden Co.
Kraft Chemical Co.
T. F. McAdam, Inc.
Pacific Vegetable Oil Corp. Ind. Div.
Spencer Kellogg & Sons, Inc.

Cotton Seed

E. F. Drew & Co.
Emery Industries, Inc.
Pacific Vegetable Oil Corp., Ind. Div.
Spencer-Kellogg & Sons, Inc.

Dicyclopentadiene Copolymers

Archer-Daniels-Midland Co.
Cargill, Inc.
Farnow, Inc.
Spencer Kellogg & Sons, Inc.

Fish Oil

Archer-Daniels-Midland Co.
Crownoil Chemical Co.
Degen Oil & Chemical Co.
Farnow, Inc.
Haynie Products, Inc.
T. F. McAdam, Inc.
Pacific Vegetable Oil Corp.
Wallace & Tiernan, Harchem Div.
Werner G. Smith, Inc.

Isano

Pacific Vegetable Oil Corp., Ind. Div.

Linseed Oils

Archer-Daniels-Midland Co.
Cargill, Inc.
Central Solvents & Chemicals Co.
Degen Oil & Chemical Co.
E. F. Drew & Co. Inc.
Farnow, Inc.
T. F. McAdam, Inc.
National Lead Co.
Spencer Kellogg & Sons, Inc.
Minnesota Linseed Oil Co.
Pacific Vegetable Oil Corp., Ind. Div.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Western Solvents & Chemicals Co.

Oiticica

Brazil Oiticica, Inc.
Brazilian Industrial Oils, Inc.
Degen Oil & Chemical Co.
Farnow, Inc.
T. F. McAdam, Inc.
Pacific Vegetable Oil Corp., Ind. Div.

Petroleum Drying Oils

R. J. Brown Co.
Sun Oil Co.
Versicol Chemical Co.

Rapeseed Oil

Degen Oil and Chemical Co.

Safflower

Cargill, Inc.
Degen Oil & Chemical Co.
E. F. Drew & Co., Inc.
T. F. McAdam, Inc.
Spencer Kellogg & Sons, Inc.
Pacific Vegetable Oil Corp., Ind. Div.

Sesame

Pacific Vegetable Oil Corp., Ind. Div.

Sunflower

Pacific Vegetable Oil Corp., Ind. Div.

Soybean Oils

Archer-Daniels-Midland Co.
Cargill, Inc.
Degen Oil & Chemical Co.
E. F. Drew & Co., Inc.
Emery Industries, Inc.
Farnow, Inc.
Glidden Co.
General Mills
T. F. McAdam, Inc.
Minnesota Linseed Oil Co.
Pacific Vegetable Oil Corp., Ind. Div.
Spencer Kellogg & Sons, Inc.
A. E. Staley Mfg. Co.

Styrenated Oils

Degen Oil & Chemical Co.
Farnow, Inc.
Spencer Kellogg & Sons, Inc.
Woburn Chemical Corp.

Tall Oils

Allied Asphalt & Mineral Corp.
Arizona Chemical Co.
Central Solvents & Chemicals Co.
Crosby Chemicals, Inc.
Emery Industries Inc.
Farac Oil & Chemical Co.
Giddeon Co. Chemical Div. Organic Chemical Dept.
Glidden Co.
Hercules Powder Co.
Kraft Chemical Co.
T. F. McAdam, Inc.
Newport Industries Co., Div. of Heyden-Newport Chemical Co.
Werner G. Smith, Inc.
Union Bag & Paper Corp.
Wallace & Tiernan, Harchem Div.
West Virginia Pulp & Paper Co., Ind. Chem. Sales Div.
Western Solvents & Chemicals Co.

Tung Oil

Brazilian Industrial Oils Inc.
Degen Oil & Chemical Co.
Farnow, Inc.
Internatio-Rotterdam
Kraft Chemical Co.
T. F. McAdam, Inc.
National Tung Oil Marketing Co-operative Inc.
Pacific Vegetable Oil Corp., Ind. Div.
Werner G. Smith, Inc.

Vegblend

Minnesota Linseed Oil Co.

Vinyltoluene Copolymers

Spencer Kellogg & Sons, Inc.

FATTY ACIDS, ESTERS AND DERIVATIVES
4

Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Archer-Daniels-Midland Co.
Arizona Chemical Co.
Armour Industrial Chemical Co.
Atlas Powder Co.
Baker Castor Oil Co.
Crosby Chemical Co.
Degen Oil & Chemical Co.
E. F. Drew & Co.
Emery Industries
Fallek Products Co., Inc.
Foremost Food & Chemical Co., El Dorado Div.
General Mills, Chemical Div.
Glidden Co.
Glyco Products Co.
A. Gross & Co.
T. F. McAdam, Inc.
Onyx Chemical Corp.
Pacific Vegetable Oil Corp., Ind. Div.
M. W. Parsons-Plymouth, Inc.
Solvents & Chemicals Group
Swift & Co.
Wallace & Tiernan, Inc. Harchem Div.,
West Virginia Pulp and Paper, Ind. Chem. Sales Div.
Witco Chemical Co. Inc.
Woburn Chemical Corp.

INTERMEDIATES
5

Anhydrides & Acids

Adipic Acid
Allied Chemical Corp.
E. I. du Pont de Nemours & Co.
Monsanto Chemical Co. Organic Chemical Div.
National Aniline Div., Allied Chemical Corp.

Azelaic Acid
Armour Co. Chemical Div.
Celanese Chemical Co.
Emery Industries, Inc.

Benzoic Acids
Heyden-Newport Chemical Corp.
Hooker Chemical Corp.
Kolker Chemicals Corp.
Kraft Chemical Co.
Merck & Co.
Monsanto Chemical Co. Organic Chemicals Co.
Tennessee Products & Chemicals Corp.

Chlorendic Acid and Anhydride
Hooker Chemical Corp.

Crotonic Acid
Eastman Chemical Co.

Dicyclopentadiene
Borden Co., Chemical Div.
Enjay Co.
Union Carbide Chemicals Co.
Velsicol Chemical Corp.

Diphenolic Acid
S. C. Johnson & Son, Inc.

Di and Polybasic Acids
American Cyanamid Co. Plastics and Resin Div.
California Chemical Co.
E. I. du Pont de Nemours & Co.
Emery Industries, Inc.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
Monsanto Chemical Co. Organic Chemical Div.
National Aniline Div., Allied Chemical Corp.
Plastics Div., Allied Chemical Corp.
Chas. Pfizer & Co., Inc.
Reichhold Chemicals Inc.
Union Carbide Chemicals Co.
U. S. Industrial Chemicals Co. Div. of Nat'l Distiller and Chem. Corp.

Dodencenylsuccinic Anhydrides
National Aniline Div., Allied Chemical Corp.

Ethylhexoic Acid
Eastman Chemical Co.

Fumaric Acid
Allied Chemical Corp.
Bzura Chemical Co.
California Chemical Co.
Heyden-Newport Chemical Corp.
T. F. McAdam, Inc.
Monsanto Chemical Co., Organic Chemical Div.
National Aniline Div., Allied Chemical Corp.
Charles Pfizer & Co., Inc.
Pittsburgh Coke & Chemical Co.

Hexahydrophthalic Anhydrides
National Aniline Div., Allied Chemical Corp.

Isophthalic Acid
Amoco Chemicals Corp.
Oronite Chemical Co.

Maleic Acid
National Aniline Div., Allied Chemical Corp.

Maleic Anhydrides
Allied Chemical Corp.
American Cyanamid Co., Plastics and Resins Div.
Heyden-Newport Chemical Corp.
T. F. McAdam, Inc.
Monsanto Chemical Co., Organic Chemical Div.
National Aniline Div., Allied Chemical Corp.
Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.
Union Carbide Chemicals Co.

Naphthenic Acid
Enjay Co.
Gulf Oil Corp.
Harshaw Chemical Co.
Koppers Co. Inc., Tar Products Div.
Mobil Oil Co.
Naftone, Inc.
Sun Oil Company

Pelargonic Acid
Emery Industries, Inc.
Sindar Corp.

Phthalic Anhydride
Allied Chemical Corp.
American Cyanamid Co., Plastics and Resins Div.
Amoco Chemicals Corp.
Fallek Products Co., Inc.
Koppers Co., Inc., Tar Products Div.
T. F. McAdam, Inc.
Monsanto Chemical Div., Organic Chemicals Div.
National Aniline Div., Allied Chemical Corp.

Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Witco Chemical Co., Inc.

Pyromellitic Anhydride and Acid
E. I. du Pont de Nemours & Co.

Succinic Anhydride
National Aniline Div., Allied Chemical Corp.
Chas. Pfizer & Co., Inc.

Sulfonic Acids
Bryton Chemical Co.
Continental Oil Co.

Teraphthalic Acid
Oronite Chemical Co.

Tetrachlorophthalic Anhydride
Hooker Chemical Co.
Monsanto Chemical Co., Organic Chemical Div.

Tetrahydrophthalic Anhydrides and Acids
E. I. du Pont de Nemours & Co.
National Aniline Div., Allied Chemical & Dye Corp.

Toluic Acid
Cowles Chemical Co.

Trimellitic Anhydride
Amoco Chemicals Corp.

Polyols

Butanediol
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Celanese Chemical Corp., A Div. of Celanese Corp. of America
Union Carbide Chemicals Co.

Glycerine
Armour Industrial Chemical Co.
Central Solvents & Chemicals Co.
Dow Chemical Co.
E. F. Drew
Glycerine Corp. of America
A. Gross & Co.
Harshaw Chemical Co.
Lever Bros.
T. F. McAdam, Inc.
Reichhold Chemicals, Inc.
Shell Chemical Corp.
Solvents & Chemical Group
Swift & Co.
Western Solvents & Chemicals Co.
Woburn Chemical Corp.

Neopentyl Glycol
Eastman Chemical Co.

Pentaerythritols (Di and Tri)
Celanese Chemical Co., A Div. of Celanese Corp. of America
Central Solvents & Chemical Co.
Commercial Solvents Co.
Delaware Chemicals Inc.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
T. F. McAdam, Inc.
Olin Mathieson Chemical Corp.
Reichhold Chemicals, Inc.
Trojan Powder Co.

Polyhydrozy Resin
Dow Chemical Co.
Olin Mathieson Chemical Corp.

Sorbitol
Atlas Powder Co.
Merck & Co., Chemical Div.

Trimethylolethane
Heyden-Newport Chemical Corp.
Trojan Powder Co.

Trimethylolpropane
Celanese Chemical Co.
Heyden-Newport Chemical Corp.
Trojan Powder Co.

Miscellaneous

Acrylic Acid
E. I. du Pont de Nemours & Co.
B. F. Goodrich Chemical Co.
Rohm & Haas

Alpha Methylstyrene
Dow Chemical Co.
Hercules Powder Co.
Plastics Div., Allied Chemical Corp.

Benzoguanamine
Tennessee Products & Chemical Corp.

Bisphenol A
Dow Chemical Co.
Monsanto Chemical Co., Organic Chemical Div.
Rohm & Haas Co.
Shell Chemical Corp.
Union Carbide Chemical Co.

Caprolactam
National Aniline Div., Allied Chemical Corp.

Crotonic Acid
Eastman Chemical Products

Diethyl Aniline
National Aniline Div., Allied Chemical Corp.

Dimethyl Terphthalate
Hercules Powder Co.

Divinylbenzene
Dow Chemical Co.
Koppers Co.

Epichlorohydrin
Dow Chemical Co.
Shell Chemical Corp.
Union Carbide Chemicals Co.

Epoxy Co-Reactants
Archer-Daniels-Midland Co.
Baker Castor Oil Co.
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
General Mills, Chemical Div.
Monsanto Chemical Co., Organic Chemical Div.
National Aniline Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Union Carbide Chemical Corp.

Formaldehyde
American Cyanamid Co., Industrial Chemical Div.
Borden Chemical Co.
R. J. Brown Co.
Celanese Chemical Company, Div. of Celanese Corp. of America
Commercial Solvents Corp.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
Monsanto Chemical Co., Plastics Div.
Nitrogen Div., Allied Chemical Corp.
Olin Mathieson Chemical Corp.
Reichhold Chemicals, Inc.
Union Carbide Chemical Co.

Gilsonite
G. S. Ziegler & Co.

Glycols (Ethylene, etc.)
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Borden Chemical Co.
R. J. Brown Co.
Celanese Chemical Co., Div. of Celanese Corp. of America
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Eastman Chemical Products Co.
Enjay Co., Inc.
Farac Oil & Chemical Co.
Mercury Chemical Corp.
Modern Solvents & Chemical Corp.
Nitrogen Div., Allied Chemicals Corp.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Plastics Div., Allied Chemical Corp.
Solvents & Chemicals Group
Union Carbide Chemicals Co.
Western Solvents & Chemicals Co.
Wyandotte Chemicals Corp.

Hexamethylenetetramine
Borden Chemical Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Reichhold Chemicals, Inc.
Union Carbide Chemical Co.

Isocyanates
Carwin Chemical Co.
E. I. du Pont de Nemours & Co., Elastomer Chemicals Dept.
Mobay
National Aniline Div., Allied Chemical Corp.
Naugatuck Chemical Div., U. S. Rubber Co.

Isocyanates Co-Reactors
Baker Castor Oil Co.

M-Phenylenediamine
National Aniline Div., Allied Chemical Corp.

Methyl Esters
The Baker Castor Oil Co.
Crosby Chemical Inc.
Fallek Products Co., Inc.
Emery Industries Inc.
Foremost Food & Chemical Co., El Dorado Div.
General Mills, Inc., Chemical Div.
Hercules Powder Co.
Mercury Chemical Co.
Nopco Chemical Co.
Pacific Vegetable Oil Corp.
Rohm & Haas Co.
Stepan Chemical Co.
Union Carbide & Chemical Co.

Western Solvents & Chemicals Co.

Methyl Gluoside
Corn Products Refining Co.

Naphthol AS
National Aniline Div., Allied Chemical Corp.

Organic
Eastman Chemical Products
Mercury Chemical Corp.
National Aniline Div., Allied Chemical Corp.
Olin Mathieson Chemical Corp.
Pennsylvania Ind. Chem. Corp.
Pfister Chemical Works

Pentanoic Acid
S. C. Johnson & Son, Inc.

p-tert Butylphenol
Stepan Chemical Co.

Phenols
American Cyanamid Co., Organic Chemical Div.
Borden Chemical Co.
Dow Chemical Co.
Eastman Chemical Products
Hercules Powder Co.
Hooker Chemical Corp.
Koppers Co.
Mercury Chemical Co.
Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals Inc.
Union Carbide Chemicals Co.
U. S. Steel Co.

Resorcinol
Borden Chemical Co.
Heyden-Newport Chemical Corp.
Koppers Co.
Reichhold Chemicals Inc.
Sindar Corp.
Union Carbide Chemicals Co.

Silicone Intermediates
Dow Corning Corp.
General Electric, Silicone Products Dept.
Union Carbide Corp., Silicone Div.

Styrene Monomer
R. J. Brown Co.
Cosden Petroleum Corp.
Dow Chemical Corp.
Koppers Co.
Monsanto Chemical Co., Plastics Div.
Shell Chemical Corp.
Union Carbide Chemicals Co.

Sucrose Acetateisobutyrate
Eastman Chemical Co.

Tar Bases and Acids
The Borden Chemical Co.
Koppers Co.
T. F. McAdam, Inc.
Mobil Oil Co.
Pittsburgh Coke & Chemical Co.
Plastics Div., Allied Chemical Corp.
Witco Chemical Co., Inc.

Ureas
American Cyanamid Co., Plastics and Resins Div.
Borden Chemical Co.
Central Solvents & Chemical Co.
E. I. du Pont de Nemours & Co.
Grace Chemical Co., Div. of W. R. Grace & Co.
Nitrogen Div., Allied Chemical Corp.
Reichhold Chemicals Inc.
Sohio Chemical Co.

Vinyl Pyridine
General Tire & Rubber Co.

Vinyltoluene
Dow Chemical Co.
Rosin & Terpene Chemicals
Archer-Daniels-Midland Co.
Arizona Chemical Co.
Aromatic Products, Inc.
Godfrey L. Cabot
Central Solvents and Chemical Co.
Crosby Chemical Co.
Dixie Pine Products
Glidden Co.
Hercules Powder Co.
T. F. McAdam, Inc.

Rosin and Terpene Chemicals
Central Solvents and Chemicals Co.
Crosby Chemical Inc.
Glidden Co., Chemical Div., Organic Chemical Dept.
Hercules Powder Co.
T. F. McAdam, Inc.
Newport Industries Co., A Div. of Heyden-Newport Chemical Co.
Pennsylvania Chem. Ind. Corp.
Reichhold Chemicals, Inc.
Schenectady Varnish Co., Inc.
Solvents & Chemicals Group
Southern Naval Stores
Union Bag-Camp Paper Corp.
Western Solvents & Chemicals Co.
West Virginia Pulp & Paper Industrial Chemical Sales Div.
G. S. Ziegler & Co.
Zophar Mills

LATEX EMULSIONS
6

Acrylic
American Cyanamid Co., Plastics and Resin Div.
Celanese Chemical Co., Div. of Celanese Corp. of America
Colton Chemical Co., Div. Air Reduction Co., Inc.
Borden Chemical Co.
Dow Chemical Co.
Firestone Plastics Co.
H. B. Fuller Co.
Goodyear Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Monsanto Chemical Co., Plastics Div.
Morningstar & Paisley Inc.
National Starch & Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Stein, Hall & Co., Inc.
U.B.S. Chemical Co.
Union Carbide Chemical Co.
U. S. Coating Co.
Union Bay State Chemical Co.
Wica Chemicals, Inc.

Epoxy Ester Emulsion
Jones-Dabney Co.

Interpolymer Type
Colton Chemical Co., Div. Air Reduction Co., Inc.
Dow Chemical Co.
Farnow, Inc.
Firestone Plastics Co.
H. B. Fuller Co.
General Tire & Rubber Co., Chemical Div.
Goodyear Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Monsanto Chemical Co., Plastics Div.
Morningstar & Paisley Inc.
National Starch & Chemical Corp.
Reichhold Chemicals, Inc.
Shawinigan Resins Corp.

Latex Base
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Farac Oil & Chemical Co.
Goodyear Tire & Rubber Co., Chemical Div.
Naftone, Inc.
National Starch & Chemical Corp.
Naugatuck Chemical Div., U. S. Rubber Co.
U. S. Coatings Co.
Union Carbide Chemical Co.

Nitrile Latex
Naugatuck Chemical Div., U. S. Rubber Co.

Polystyrene Emulsions
Borden Chemical Co.
Dow Chemical Co.
Goodyear Tire & Rubber Co., Chemical Div.
Koppers Co. Inc., Chemical Div.
Monsanto Chemical Co., Plastics Div.
Union Bay State Chemical Co.
Union Carbide Plastics Co.
T. F. Washburn Co.
Western Solvents & Chemicals Co.

Polyvinyl Acetate Emulsions
Alkydol Laboratories, Div. of Reichhold Chemical Inc.
American Alkyd Industries
Borden Chemical Co.
Calvert-Mount Winans
Celanese Chemical Co., Div. of Celanese Corp. of America
Colton Chemical Co., Div. of Air Reduction Co. Inc.
H. B. Davis Co. Inc.
Dewey & Almy Chemicals, Div. of W. R. Grace Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Farnow, Inc.
H. B. Fuller Co.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Jones-Dabney Co.
McCloskey Varnish Co.
McWhorter Chemicals, Inc.
Morningstar-Paisley, Inc.
National Starch & Chemical Corp.

Onyx Chemical Corp.
Perfection Varnish Co.
Reichhold Chemicals, Inc.
Shawinigan Resins Corp.
Stein, Hall & Co., Inc.
Union Carbide Plastics Co.
U. S. Coatings Co.
R. T. Vanderbilt Co.
T. F. Washburn Co.
Wica Chemicals, Inc.

Polyvinyl Chloride Copolymers
Firestone Plastics Co.
B. F. Goodrich Chemical Co.

Styrene-Butadiene
Borden Chemical Co.
Dewey & Almy Chemicals, Div. W. R. Grace & Co.
Dow Chemical Co.
Firestone Plastics Co.
General Tire & Rubber Co., Inc., Chemical Div.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Inc., Chemical Div.
Koppers Co. Inc., Chemical Div.
Marbon Chemical Div. of Borg-Warner Corp.
Naugatuck Chemical, Div. U. S. Rubber Co.
Union Bay State Chemical Co.
U. S. Rubber Co., Naugatuck Chemical Div.
Wica Chemicals, Inc.

Synthetic Types
Borden Chemical Co.
California Ink Co., Inc.
Dow Chemical Co.
B. F. Goodrich Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Farnow, Inc.
Goodyear Tire & Rubber Co., Chemical Div.
Monsanto Chemical Co., Plastics Div.
National Starch & Chemicals Corp.
Pennsylvania Industrial Chemical Corp.
Reichhold Chemicals Inc.
Stein, Hall & Co., Inc.
Union Carbide & Chemical Co.
Velsicol Chemical Corp.

Vinyl-Acrylic
National Starch & Chemical Corp.
Union Carbide Plastics Co.

Vinyl-Acrylic-Alkyd
Archer-Daniels-Midland Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Elastomer Chemicals Dept.

Vinylidene Chloride
Borden Chemical Co.
Dow Chemical Co.
National Starch & Chemical Corp.

Miscellaneous Types
Alkydol Laboratories, Inc.
Archer-Daniels-Midland Co.
Cargill, Inc.
General Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Pennsylvania Industrial Chemicals Corp.
Velsicol Chemical Corp.

PIGMENTS
7

Whites
LEAD
Basic Carbonate White Lead
The Bunker Hill Co., Chemical Products Div.
Chemicals & Metals Div., The Eagle-Picher Co.
Kraft Chemical Co.
National Lead Co.
Rona Pearl Corp., A Div. of Rona Laboratories, Inc.
White Basic Lead Sulfate
The Bunker Hill Co., Chemical Products Div.
Chemicals & Metals Div., The Eagle-Picher Co.
Kraft Chemical Co.
Basic Silicate White Lead
National Lead Co.
ZINC PIGMENTS
Zinc Oxides
American Zinc Sales Co.
Berkshire Chemicals, Inc.
The Bunker Hill Co., Chemical Products Div.
Chemical & Metals Div., The Eagle-Picher Co.
The Harshaw Chemical Co.
Kraft Chemical Co.
The New Jersey Zinc Co.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Smith Chemical & Color Company, Inc.
Leaded Zinc Oxides
American Zinc Sales Co.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Zinc Sulfide
Chemicals & Metals Div., The Eagle-Picher Co.
The New Jersey Zinc Co.
C. J. Osborn Co.
Lithopone
The Glidden Co., Chemicals Div.
C. J. Osborn Co.

Pigment Color and Chemical Div., The Sherwin-Williams Co.
Smith Chemical & Color Co., Inc.

TITANIUM

Titanium Dioxide
American Cyanamid Co., Pigments Div.
E. I. du Pont de Nemours & Co., Inc.
The Glidden Co., Chemicals Div.
Kraft Chemical Co.
The New Jersey Zinc Co.
Titanium Pigment Corp.
R. T. Vanderbilt Co.

Titanium-calcium
E. I. du Pont de Nemeours & Co., Inc.
Titanium Pigment Corp.

Titanated Lithopone
The Glidden Co., Chemicals Div.

Black

Carbon Black
Cabot Corp.
Columbian Carbon Co.
J. M. Huber Corp.
Stanley Doggett, Inc.
United Carbon Co.
Witco Chemical Co., Inc.

Lampblack
Columbian Carbon Co.
General Carbon Co.
The Harshaw Chemical Co.
Monsanto Chemical Co., Inorganic Chemical Div.
Mineral Pigments Corp.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Channel Black
J. M. Huber Corp.
United Carbon Co.

Furnace Black
Cabot Corp.
Columbian Carbon Co.
Stanley Doggett, Inc.
United Carbon Co.
R. T. Vanderbilt Co.
Witco Chemical Co., Inc.

Vegetable Black
Smith Chemical & Color Company, Inc.
Stanley Doggett, Inc.

Animal Black
Columbian Carbon Co.
Mineral Pigments Corp.

Graphite
The Harshaw Chemical Co.

Mineral Black
Mineral Pigments Corp.
J. Lee Smith & Co., Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Tamms Industries Co.
C. K. Williams & Co.

Black Iron Oxide
Columbian Carbon Co., Mapico Iron Oxides Unit
The Harshaw Chemical Co.
Mineral Pigments Corp.
Northern Pigment Co., Limited
C. J. Osborn Co.
Reichard-Coulston, Inc.
J. Lee Smith & Co., Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Aniline Black
Ansbacher-Siegle Corp.

Inorganic Colors

BLUES

Cobalt blue
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
Stanley Doggett, Inc.
United Ultramarine & Chemical Co., Inc.

Iron Blue
American Cyanamid Co., Pigments Div.
The California Ink Co.
J. S. & W. R. Eakins, Inc.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
C. J. Osborn Co.
Reichhold Chemicals, Inc.
Smith Chemical & Color Co., Inc.
Standard Ultramarine & Color Co.
Western Dry Color Co.

Ultramarine Blue
H. Kohnstamm & Company, Inc.
Smith Chemical & Color Co., Inc.
Standard Ultramarine & Color Co.
Stanley Doggett, Inc.
United Ultramarine & Chemical Co., Inc.
Whittaker, Clark & Daniels, Inc.

BROWNS

Hydrated Iron Oxide
Columbian Carbon Co., Mapico Iron Oxides Unit
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Northern Pigment Company Limited
Reichard-Coulston, Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
C. K. Williams & Co.

GREENS

Chrome Greens
American Cyanamid Co., Pigments Div.
J. S. & W. R. Eakins, Inc.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
Mineral Pigments Corp.
Reichhold Chemicals, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Western Dry Color Co.

Chromium Oxide
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
C. K. Williams & Co.

Hydrated Chromium Oxide
H. Kohnstamm & Co., Inc.
Stanley Doggett, Inc.
United Ultramarine & Chemical Co., Inc.
C. K. Williams & Co.

Zinc Greens
Mineral Pigments Corp.
Reichhold Chemicals, Inc.
Western Dry Color Co.

Oranges & Yellows

Cadmium Yellows
The Glidden Co., Chemicals Div.
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Reichhold Chemicals, Inc.
Stanley Doggett, Inc.

Chrome Yellows & Oranges
American Cyanamid Co., Pigments Div.
The California Ink Co.
E. I. du Pont de Nemours & Co., Inc.
J. S. & W. R. Eakins, Inc.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Reichhold Chemicals, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Western Dry Color Co.

Molybdate Chrome Orange
American Cyanamid Co., Pigments Div.
The California Ink Company
J. S. & W. R. Eakins, Inc.
E. I. du Pont de Nemours & Co., Inc.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Reichhold Chemicals, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Western Dry Color Co.

Orange Mineral
Eagle-Picher Co.

Yellow Iron Oxide
Columbian Carbon Co., Mapico Iron Oxides Unit
The Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Northern Pigment Company, Limited
C. J. Osborn Company
Reichard-Coulston, Inc.
J. Lee Smith & Company, Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Tamms Industries Co.
C. K. Williams & Co.

Zinc Yellow
American Cyanamid Co., Pigments Div.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
J. S. & W. R. Eakins, Inc.

REDS and MAROONS

Cadmium Reds
The Glidden Company, Chemicals Div.
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Stanley Doggett, Inc.

Copper Maroon
E. I. du Pont de Nemours & Co., Inc.

Cuprous Oxide
The Glidden Co., Chemicals Div.
C. K. Williams & Co.

English Vermilion
H. Kohnstamm & Co., Inc.
Stanley Doggett, Inc.

Mercuric Oxide
H. Kohnstamm & Co., Inc.
Charles Pfizer & Co., Inc.

Mercury-Cadmium Reds
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.

Red Iron Oxide
R. E. Carroll, Inc.
Columbian Carbon Co., Mapico Iron Oxides Unit
The Harshaw Chemical Co.
Mineral Pigments Corp.
Northern Pigment Company, Limited
C. J. Osborn Co.
Reichard-Coulston, Inc.
J. Lee Smith & Co., Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Tamms Industries Company
C. K. Williams & Co.

Venetian Red
Mineral Pigments Corp.
Reichard-Coulston, Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
J. Lee Smith & Co., Inc.
Tamms Industries Co.

MISCELLANEOUS

Ochers
H. Kohnstamm & Company, Inc.
Mineral Pigments Corp.
C. J. Osborn Company
Reichard-Coulston, Inc.
J. Lee Smith & Co., Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Tamms Industries Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Siennas
H. Kohnstamm & Company, Inc.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
J. Lee Smith & Co., Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Umbers
H. Kohnstamm & Company, Inc.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
J. Lee Smith & Co., Inc.
Smith Chemical & Color Co., Inc.
Stanley Doggett, Inc.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Antimony Oxide
National Lead Co.

Organic Colors

BLUES and VIOLETS

Alizarine Blue
Collway Colors, A Div. of General Aniline & Film Corp.
The Harshaw Chemical Co.

Alkali Blue
American Cyanamid Co., Pigments Div.
Sandoz, Inc.
Standard Ultramarine & Color Co.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Dibenzanthrone Violet
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Indanthrene Blues
Collway Colors, A Div. of General Aniline & Film Corp.

Methyl Violet
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co., Inc.
Collway Colors, A Div. of General Aniline & Film Corp.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

P M A and P T A Blues
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
J. S. & W. R. Eakins, Inc.
Collway Colors, A Div. of General Aniline & Film Corp.

Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Western Dry Color Co.

Peacock Blues
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
The Hilton-Davis Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.

Phthalocyanine Blues
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
The California Ink Co.
Ciba Co., Inc., Pigments Div.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Company, Inc.
The Hilton-Davis Chemical Co.
Kraft Chemical Company
Mineral Pigments Corp.
Pittsburgh Chemical Co., A Subsidiary of Pittsburgh Coke & Chemical Co.
Sandoz, Inc.
Stanley Doggett, Inc.
Standard Ultramarine & Color Co.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Western Dry Color Co.

Tungstated Blues and Violets
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
J. S. & W. R. Eakins, Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Western Dry Color Co.

Carbazole Violet
Collway Colors, A Div. of General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Dianisidine Blue
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Dioxazene Carbazol Violets
Carbic-Hoechst Corp.

Indanthrone Blues
Ciba Co., Inc., Pigments Div.
E. I. du Pont de Nemours & Co., Inc.

Quinacridone Violets
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.

GREENS

Indanthrene Greens
Western Dry Color Co.

Phthalocyanine Greens
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
The California Ink Co.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
The Harshaw Chemical Co.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Kraft Chemical Co.
Mineral Pigments Corp.
Pittsburgh Chemical Co., A Subsidiary of Pittsburgh Coke & Chemical Co.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Stanley Doggett, Inc.

Pigment Green B
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Kraft Chemical Company
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

P M A and P T A Greens
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
J. S. & W. R. Eakins, Inc.
Holland Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
Sandoz, Inc.

ORANGES and YELLOWS

Benzidene Oranges and Yellows
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
Carbic-Hoechst Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Federal Color Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Interchemical Corp., Color & Chemical Div.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Company, Inc.
Mineral Pigments Corp.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Western Dry Color Co.

Dinitraniline Orange
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
J. W. & W. R. Eakins, Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

Flavanthrone
Ciba Co., Inc., Pigment Div.

Hansa Yellows
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
The California Ink Co.
Carbic-Hoechst Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
J. S. & W. R. Eakins, Inc.
Federal Color Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Kraft Chemical Co.
Mineral Pigments Corp.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Helio Yellows
Collway Colors, A Div. of General Aniline & Film Corp.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.

Orthonitraniline Orange
Collway Colors, A Div. of General Aniline & Film Corp.
Federal Color Co.

The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

Permanent Orange
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

Persian Orange
Ansbacher-Siegle Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.

Acylamino Yellow
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Anthropyrimidine Yellow
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Naphthol Yellow
Carbic-Hoechst Corp.

Vat Yellow
Collway Colors, A Div. of General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Interchemical Corp., Color & Chemical Div.
Sandoz, Inc.

REDS and MAROONS

Alizarine Reds and Maroons
Ansbacher-Siegle Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Anthanthrone Scarlet
Ciba Co., Inc., Pigment Div.

Arylide Maroons
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

B. O. N. Reds and Maroons
Ansbacher-Siegle Corp.
American Cyanamid Co., Pigments Div.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Federal Color Co.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Western Dry Color Co.

Helio Bordeaux
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
The Harshaw Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.

B-Hydroxynaphthoic Maroons
H. Kohnstamm & Co., Inc.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Lithol Rubines
Ansbacher-Siegel Corp.

American Cyanamid Co., Pigments Div.
The California Ink Company
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Federal Color Co.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Western Dry Color Co.

Lithol Toners
Ansbacher-Siegle Corp.
The California Ink Company
Collway Colors, A Div. of General Aniline & Film Corp.
J. S. & W. R. Eakins, Inc.
Federal Color Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

Naphthol Red
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
Carbic-Hoechst Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
J. S. & W. R. Eakins, Inc.
Federal Color Co.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

Para Reds
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
The California Ink Co.
E. I. du Pont de Nemours & Co., Inc.
J. S. & W. R. Eakins, Inc.
Federal Color Company
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Western Dry Color Company

P T A Rhodamines
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
J. S. & W. R. Eakins, Inc.
Federal Color Company
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.

Pigment Scarlets
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co., Inc.
Collway Colors, A Div. of General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Pyrazolone Reds
Ansbacher-Siegle Corp.
Carbic-Hoechst Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Red Lakes
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
The California Ink Co.
Collway Colors, A Div. of General Aniline & Film Corp.
E. I. du Pont de Nemours & Co., Inc.
Federal Color Company
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Company
The Hilton-Davis Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.

Rubine Reds
Ansbacher-Siegle Corp.
The California Ink Co.
Collway Colors, A Div. of General Aniline & Film Corp.
Federal Color Co.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Thio Indigoids
Carbic-Hoechst Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Interchemical Corp., Color & Chemical Div.
H. Kohnstamm & Co., Inc.

Toluidine Reds and Maroons
American Cyanamid Co., Pigments Div.
The California Ink Co.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co., Inc.
J. S. & W. R. Eakins, Inc.
Federal Color Company
Harmon Colors, National Aniline Div., Allied Chemical Corp.
The Harshaw Chemical Co.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
Mineral Pigments Corp.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Standard Ultramarine & Color Co.
Western Dry Color Company

Acridone Red
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Oxazole Red
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Perylene Reds
Carbic-Hoechst Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Quinacridone Reds
E. I. du Pont de Nemours & Co., Inc.
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Vat Reds
Collway Colors, A Div. of General Aniline & Film Corp.
Sandoz, Inc.

MISCELLANEOUS

Indulines
Ansbacher-Siegle Corp.

Nitroso Dyes
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.

F. D. & C. Colors
H. Kohnstamm & Co., Inc.

Lakes & Toners
American Cyanamid Co., Pigments Div.
The California Ink Co.
Collway Colors, A Div. of General Aniline & Film Corp.
The Harshaw Chemical Co.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Dispersions
American Cyanamid Co., Pigments Div.
The California Ink Co.
Carbon Dispersions, Inc.
Ciba Co., Inc., Pigments Div.
Claremont Pigment Dispersion Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
Daniel Products Company
Federal Color Company
The Harshaw Chemical Co.
Horn, Jeffreys & Company
Interchemical Corp., Color & Chemicals Div.
Kentucky Color & Chemical Co., Div. of Harshaw Chemical Co.
H. Kohnstamm & Co., Inc.
Kromall Chemical & Dispersions Corp.
Pennsylvania Color and Chemical Co.
Sandoz, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Metallic
Aluminum Pastes & Powders
Atlantic Powdered Metals, Inc.
Claremont Pigment Dispersion Corp.
Metals Disintegrating Co., Div. American-Marietta Co.
Reynolds Metals Co.
Silberline Manufacturing Co., Inc.
U. S. Bronze Powders, Inc.

Bronze Powders
Atlantic Powdered Metals, Inc.
Metals Disintegrating Co., Div. American-Marietta Co.

Green Gold Type
Atlantic Powdered Metals, Inc.
Metals Disintegrating Co., Div. American-Marietta Co.

Stainless Steel
Atlantic Powdered Metals, Inc.
Metals Disintegrating Co., Div. American-Marietta Co.
Micronized Metals, Inc.
Smith Chemical & Color Co., Inc.

Zinc Dust
The Bunker Hill Co., Chemical Products Div.
The New Jersey Zinc Co.

Copper Powders
Atlantic Powdered Metals, Inc.

Lead Pastes and Powders
Metalead Products Corp.

Non-Toxic Colorants
Ansbacher-Siegle Corp.
The California Ink Co.
Columbian Carbon Co., Mapico Iron Oxides Unit
H. Kohnstamm & Co., Inc.
Rona Pearl Corp., A Div. of Rona Laboratory, Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Extenders & Fillers
Burgess Pigment Co.
Cabot Corp.
Carbola Chemical Company, Inc.
Harry T. Campbell Sons' Inc.
Carey-Canadian Mines Ltd.
R. E. Carroll, Inc.
Concord Mica Corp.
De Lore Div., National Lead Co.
Desert Minerals, Inc.
Diamond Alkali Co.
The Dow Chemical Co.
The English Mica Company
Franklin Mineral Products Co.
Georgia-Kaolin Company
The Georgia Marble Company, Calcium Products Div.
Great Lakes Carbon Corp., Mining & Mineral Products Div.
Hayden Mica Company, Inc.
J. M. Huber Corp.
International Talc Company, Inc.
Johns-Manville Corp.
Kennedy Minerals Company, Inc.
Merck Marine Magnesium Div.
Minerals & Chemicals Philipp Corp.
National Lead Co.
Smith Chemical & Color Co., Inc.
Southern Clays Inc.
Tamms Industries Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.
Wyandotte Chemicals Corp.
R. T. Vanderbilt Co.

Fluorescent
Collway Colors, A Div. of General Aniline & Film Corp.
Lawter Chemicals
Radiant Color Co.

Flush Colors
American Cyanamid Co., Pigments Div.
Ansbacher-Siegle Corp.
The California Ink Co.
Claremont Pigment Dispersion Corp.
Collway Colors, A Div. of General Aniline & Film Corp.
The Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Pigment Color and Chemical Div., The Sherwin-Williams Co.

Pearl Essence
Claremont Pigment Dispersion Corp.
The Mearl Corp.
National Lead Co.
Rona Pearl Corp., A Div. of Rona Laboratory Inc.

Rust-Inhibitive Pigments
Basic Lead Silico Chromate
Bunker Hill Co., Chemical Products Div.
Eagle-Picher Co.
National Lead Co.
Litharge
Bunker Hill Co., Chemical Products Div.
Eagle-Picher Co.
Red Lead
Bunker Hill Co., Chemical Products Div.
Eagle-Picher Co.
Kraft Chemical Co.
Sublimed Blue Lead
Bunker Hill Co., Chemical Products Div.
Eagle-Picher Co.

PLASTICIZERS
8

Acetates
American Mineral Spirits Co.
Eastman Chemical Products, Inc.
Mercury Chemical Corp.
Reichhold Chemicals, Inc.
Western Solvents & Chemicals Co.

Adipates
Central Solvents & Chemicals Co.
Dehydag-Deutsche Hydrierwerke GmBH
Eastman Chemical Products, Inc.
Chemicals & Plastics Div., Food Machinery & Chemical Corp.
B. F. Goodrich Chemical Co.
The C. P. Hall Company of Illinois
Hercules Powder Co.
Mercury Chemical Corp.
Monsanto Chemical Co., Organic Chemical Div.
Charles Pfizer & Co., Inc.
Pittsburgh Chemical Co., A subsidiary of Pittsburgh Coke & Chemical Co.
Plastic Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Union Carbide Chemical Co.
Harchem Div., Wallace & Tiernan, Inc.
Western Solvents & Chemicals Co.

Azelates
Eastman Chemical Products, Inc.
Emery Industries, Inc.
The C. P. Hall Company of Illinois
Charles Pfizer & Co., Inc.
Reichhold Chemicals, Inc.

Butyrates
Eastman Chemical Products, Inc.
Reichhold Chemicals, Inc.
Union Carbide Chemical Co.

Caprates
E. F. Drew & Co., Inc.

Caprylates
E. F. Drew & Co., Inc.
Foremost Food & Chemical Co., El Dorado Div.

Chlorinated Biphenyl
Monsanto Chemical Co., Organic Chemical Div.

Chlorinated Paraffins
Central Solvents & Chemical Co.
Commercial Solvents Corp.
Hercules Powder Co.

Koppers Co., Inc., Tar Products Div.
Western Solvents & Chemicals Co.

Citrates
Charles Pfizer & Co., Inc.

Coal-tar oils
Koppers Co., Inc., Plastics Div.
Koppers Co., Inc., Tar Products Div.
Neville Chemical Co.
Velsicol Chemical Corp.

Coumarone-indene
Neville Chemical Co.
Plastics Div., Allied Chemical Corp.

Dibenzoates
Tennessee Products & Chemical Corp.

Epoxy
Archer-Daniels-Midland Co.
The Baker Castor Oil Co.
Rohm & Haas Co.

Fatty Acid Epoxy Esters
Crosby Chemical, Inc.

Hydrocarbon Polymers
Velsicol Chemical Corp.

Laurates
E. F. Drew Co., Inc.
Fallek Products Co., Inc.
The C. P. Hall Co. of Illinois
Hodag Chemical Corp.
Nopco Chemical Co.

α-Methylstyrene
The Dow Chemical Co.
Hercules Powder Co.

Myristates
E. F. Drew & Co., Inc.
Fallek Products Co., Inc.
Hodag Chemical Corp.

Nitrile Rubber
B. F. Goodrich Chemical Co.

Oleates
Central Solvents & Chemical Co.
Dehydag-Deutsche Hydrierwerke GmBH
Chemicals & Plastics Div., Food Machines and Chemical Corp.
The C. P. Hall Co. of Illinois
Hodag Chemical Corp.
Nopco Chemical Co.
Harchem Div., Wallace & Tiernan, Inc.
Witco Chemical Co., Inc.

Palmitates
The C. P. Hall Co. of Illinois
Hodag Chemical Corp.

Pelargonates
Emery Industries, Inc.

Pentaerythritol Ester
Alkydol Laboratories, Div. of Reichhold Chemical Inc.
Degan Oil & Chemical Co.
Hercules Powder Co.
Hodag Chemical Corp.
Reichhold Chemicals, Inc.

Petroleum Oil
Velsicol Chemical Corp.

Phosphates
Celanese Chemical Co.
Central Solvents & Chemical Co.
Commercial Solvents Corp.
The Dow Chemical Co.
Chemicals & Plastics Div., Food Machinery & Chemical Corp.
Monsanto Chemical Co., Organic Chemical Div.
Western Solvents & Chemical Co.

Phthalates
Central Solvents & Chemical Co.
Chemical-Solvents, Inc.
Colton Chemical Co., A Div. of Air Reduction Co., Inc.
Commercial Solvents Corp.
Dehydag-Deutsche Hydrierwerke GmBH
Eastman Chemical Products, Inc.
Chemicals & Plastics Div., Food Machinery & Chemical Corp.
B. F. Goodrich Chemical Co.
The C. P. Hall Co. of Illinois
Hercules Powder Co.
Koppers Co., Inc., Tar Products Div.
Mercury Chemical Corp.
Monsanto Chemical Co., Organic Chemical Div.
Charles Pfizer & Co., Inc.
Pigment Color and Chemical Div., The Sherwin-Williams Co.
Pittsburgh Chemical Co., A subsidiary of Pittsburgh Coke & Chemical Co.
Plastics Div., Allied Chemical Corp.
Reichhold Chemical, Inc.
Rohm & Haas Co.
Union Carbide Chemical Co.
Harchem Div., Wallace & Tiernan, Inc.
Western Solvents & Chemical Co.
Witco Chemical Co., Inc.

Polymerics
Archer-Daniels-Midland Co.
Argus Chemical Corp.
Emery Industries, Inc.

Polyesters (linear)
Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Cambridge Industries Co.
Degan Oil & Chemical Co.
The C. P. Hall Co. of Illinois
Monsanto Chemical Co., Organic Chemical Div.
Rohm & Haas Co.
Schenectady Varnish Co., Inc.
Union Carbide Chemical Co.
Harchem Div., Wallace & Tiernan, Inc.

Polyglycols
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
The Dow Chemical Co.
Nopco Chemical Co.
Olin-Mathieson Chemical Corp.
Union Carbide Chemical Co.
Wyandotte Chemicals Corp.

Ricinoleates
The Baker Castor Oil Co.
Chemicals & Plastics Div., Food Machinery & Chemical Corp.
The C. P. Hall Co. of Illinois
Hodag Chemical Corp.
Nopco Chemical Co.
Reichhold Chemicals, Inc.

Sebacates
Dehydag-Deutsche Hydriewerke GmBH
Eastman Chemical Products, Inc.
The C. P. Hall Co. of Illinois
Kraft Chemical Co.
Mercury Chemical Corp.
Charles Pfizer & Co., Inc.
Pittsburgh Chemical Co., A subsidiary of Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Harchem Div., Wallace & Tiernan, Inc.
Western Solvents & Chemical Co.
Witco Chemical Co., Inc.

Stearates
Argus Chemical Corp.
Central Solvents & Chemical Co.
Commercial Solvents Corp.
Chemicals & Plastics Div., Food Machinery & Chemical Corp.
The C. P. Hall Co. of Illinois
The Harshaw Chemical Co.
Kraft Chemical Co.
Mallinckrodt Chemical Works
Nopco Chemical Co.
Smith Chemical & Color Co., Inc.
Harchem Div., Wallace & Tiernan, Inc.
Western Solvents & Chemical Co.
Whittaker, Clark & Daniels, Inc.
Witco Chemical Co., Inc.

Sulfonamide
Monsanto Chemical Co., Organic Chemical Div.

RESINS
9

Acrylics
American Alkyd Industries
American Cyanamid Co., Plastics and Resins Div.
Archer-Daniels-Midland Co.
Borden Co., Chemical Div.
The California Ink Co.
Catalin Corp. of America
Colton Chemical Co., A Div. of Air Reduction Co., Inc.
E. I. du Pont de Nemours & Co., Inc.
Goodyear Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Jones-Dabney Co., Div. Devoe & Reynolds Co., Inc.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Union Carbide Chemical Co.

Alkyds
Adco Chemical Co.

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Plastics & Resin Div.
American Alkyd Industries
Archer-Daniels-Midland Co.
Basic Varnish & Research Corp.
California Chemical Co.
The California Ink Co.
Cambridge Industries Co.
Cargill, Inc.
Crosby Chemicals
Crownoil Chemical Co.
H. B. Davis Co., Inc.
Degen Oil Chemical Co.
Farac Oil & Chemical Co.
Farnow, Inc.
France, Campbell and Darling, Inc.
Freeman Chemical Corp.
Haynie Products, Inc.
Hercules Powder Co.
The Hilton-Davis Chemical Co.
Jones-Dabney Co.
Kraft Chemical Co.
Lawter Chemicals, Inc.
McCloskey Varnish Co.
McWhorter Chemicals, Inc.
Mercury Chemical Co.
Midwest Synthetics Co.
Nelio Resins Inc.
C. J. Osborn Co.
Plastics Div., Allied Chemical Corp.
Price Varnish Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Specialty Resin Co.
Fred'k A. Stresen-Reuter Inc.
Synvar Corp.
Thibaut & Walker Co., Inc.
U. S. Coatings Co.
T. F. Washburn Co.

Alkylated Phenol

Dow Chemical Co.
Koppers Co. Inc., Tar Products Div.
Lawter Chemicals
Nelco Resins Corp.
Neville Chenical Co.
Varcum Chemical Div. of Reichhold Chemicals Inc.

Allylics

Food Machinery & Chemical Corp., Chemicals and Plastics Div.

Bleach Shellac

Acme Shellac Products Co.
Bradshaw-Praegert Co.
The Mantrose Corp.
William Zinsser & Co.

Cellulosics

Celanese Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Eastman Chemical Products, Inc.
Hercules Powder Co.
Horn, Jeffreys Co.

Chlorinated Rubber

E. I. du Pont de Nemours & Co., Inc.
Goodyear Tire & Rubber Chemical Div.
Hercules Powder Co.
Naftone, Inc.

Copal Type

Lawter Chemicals, Inc.

Coumarone-Indene

Neville Chemical Co.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Pennsylvania Industrial Chemical Corp.
Plastics Div., Allied Chemical Corp.
Price Varnish Co.
Velsicol Chemical Corp.

Cyclized Rubber

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Goodyear Tire & Rubber Co., Inc.
Naftone, Inc.
Reichhold Chemicals, Inc.

Cyclopentadiene

Archer-Daniels-Midland Co.
Cargill, Inc.
Interchemical Corp., Color & Chemical Div.
R-B-H Dispersions, Div. of Interchemical Corp.
Velsicol Chemical Corp.

Epoxy

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Allied Asphalt & Mineral Corp.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Ciba Products Corp.
Dow Chemical Co.
Food Machinery & Chemical Corp., Chemicals and Plastics Div.
Jones-Dabney Co.
Pittsburgh Coke and Chemical Co.
Reichhold Chemicals, Inc.
Schenectady Varnish Co.
Shell Chemical Corp.
Sherwin-Williams Co.
Union Carbide Plastics Co.

Epoxy Esters

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Celanese Chemical Co., A Div. of Celanese Corp. of America
Crownoil Chemical Co.
H. B. Davis Co.
Degen Oil & Chemical Co.
Dehydag-Deutsche Hydrierwerke GmBH
Farnow, Inc.
France, Campbell and Darling, Inc.
Freeman Chemical Corp.
Jones-Dabney Co.
McCloskey Varnish Co.
Midwest Synthetics Co.
C. J. Osborn Co.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Fred'k Stresen-Reuter, Inc.
Union Coating Chemicals, Co.
U. S. Coatings Co.
T. F. Washburn Co.

Ester Gum Solutions

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Alkyd Industries
Archer-Daniels-Midland Co.
The California Ink Co.
Central Solvents & Chemical Co.
Crosby Chemicals, Inc.
H. B. Davis Co.
Farnow, Inc.
Glidden Co.
Hercules Powder Co.
Kraft Chemical Co.
McCloskey Varnish Co.
Nelco Resins Inc.
C. J. Osborn Co.
Pine Chemicals, Inc.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Synvar Corp.
U. S. Coatings Co.

Fumaric

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Archer-Daniels-Midland Co.
California Ink Co., Inc.
Crownoil Chemical Co., Inc.
The California Ink Co., Inc.
Farac Oil & Chemical Co.
Filtered Rosin Products, Inc.
France, Campbell and Darling, Inc.
Glidden Co.
Hercules Powder Co.
Lawter Chemicals, Inc.
Nelco Resins, Inc.
C. J. Osborn & Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Resins
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Fred'k Stresen-Reuter, Inc.

Hydrocarbons

American Gilsonite Co.
Amoco Chemicals Corp.
Atlantic Refining Co.
R. J. Brown Co.
Cosden Petroleum Corp.
Dow Chemical Co.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Koppers Co., Tar Products Div.
Leonard Refineries Inc.
McCloskey Varnish Co.
Neville Chemical Co.

Pennsylvania Industrial Chemical Corp.
R-B-H Dispersions, Div. of Interchemical Corp.
Schenectady Varnish Co.
Union Carbide Chemicals Co.
U. S. Industrial Chemicals Div. of Nat'l Distillers and Chemical Corp.
Velsicol Chemical Corp.

Isocyanates

The California Ink Company, Inc.
Cargill, Inc.
The Carwin Company
E. I. du Pont de Nemours & Co., Inc.
Freeman Chemical Corp.
Mobay Chemical Co.
National Aniline Div., Allied Chemical Corp.
Naugatuck Chemical Div., U. S. Rubber Co.
Schenectady Varnish Co.

Ketone Formaldehyde

Lawter Chemicals, Inc.

Maleics

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Alkyd Industries
Archer-Daniels-Midland Co.
The California Ink Company, Inc.
Central Solvents and Chemical Co.
Crosby Chemicals, Inc.
Crownoil Chemical Co.
Farac Oil and Chemical Co.
Farnow, Inc.
France, Campbell and Darling, Inc.
Glidden Co.
Hercules Powder Co.
Jones-Dabney Co.
Lawter Chemicals, Inc.
Naugatuck Chemical Div., U. S. Rubber Co.
Nelio Resins Inc.
C. J. Osborne Co.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Fred'k Stresen-Reuter, Inc.

Melamines

American Cyanamid Co., Plastics & Resins Div.
Catalin Corp. of America
Jones-Dabney Co. Div., Devoe & Raynolds Co., Inc.
Monsanto Chemical Co., Plastics Div.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Natural Resins

Acme Shellac Products Co.
Allied Asphalt & Mineral Corp.
American Gilsonite Co.
Archer-Daniels-Midland Co.
The Borden Chemical Co.
Central Solvents and Chemical Co.
France, Campbell & Darling, Inc.
Gillespie-Rogers-Pyatt Co., Inc.
Haeuser Shellac Co.
Hercules-Powder Co.
Heyden-Newport Chemical Corp.
O. G. Innes Corp.
Internatio-Rotterdam Inc.
The Mantrose Corp.
Reichhold Chemicals, Inc.
Thibaut Chemicals, Inc.
William Zinsser & Co.

Nitrocellulose Solutions

Cellofilm Industries, Inc.
Hercules Powder Co.
Horn, Jefferys Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Phenolics

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Plastics & Resins Co.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Catalin Corp. of America
H. B. Davis Co.
Farnow, Inc.
France, Campbell & Darling, Inc.
General Electric Co., Chemical Materials Div.
Glidden Co.
Hercules Powder Co.
Koppers Co. Inc., Tar Products Div.
Krumbhaar Chemicals, Inc.
Lawter Chemicals, Inc.
McCloskey Varnish Co.
Monsanto Chemical Co., Plastics Div.
Nelio Resins Inc.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Synvar Corp.
Union Carbide Plastics Co.
Varcum Chemical Corp.

Phenol Modified Coumarone-Indene

Neville Chemical Company

Polyamides

E. I. du Pont de Nemours & Co., Inc.
Firestone Plastics Inc.
General Mills, Inc., Chemical Div.
Olin-Mathieson Chemical Corp.

Polybutenes

Advance Solvents & Chemical, Div. of Carlisle Chemical Works, Inc.
Amoco Chemicals Corp.
California Chemical Co.
Cosden Petroleum Corp.
Kraft Chemical Co.
Naftone, Inc.
Phillips Petroleum Co.

Polyesters

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Alkyd Industries
American Cyanamid Co., Plastics & Resins Div.
Archer-Daniels-Midland Co.
California Chemical Co.
The California Ink Company, Inc.
Cambridge Ind. Co.
E. I. du Pont de Nemours & Co., Inc.
Farnow, Inc.
France, Campbell and Darling, Inc.
Freeman Chemical Corp.
General Tire and Rubber Co., Chemical Div.
Goodyear Tire & Rubber Co., Chemical Div.
Hercules Powder Co.
Hooker Chemical Co.
Mobay Chemical Co.
Naftone, Inc.
Naugatuck Chemical Div., U. S. Rubber Co.
C. J. Osborn Co.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Specialty Resins Co.
Union Carbide Plastics Co.
Witco Chemical Co., Inc.

Polystyrenes

The California Ink Company, Inc.
Cosden Petroleum Corp.
Dow Chemical Co.
Koppers Co.
Monsanto Chemical Co., Plastics Div.
Pennsylvania Industrial Chemical Corp.
Shell Oil Co.
Union Carbide Plastics Co.

Polyurethanes

Baker Castor Oil Co.
Cargill, Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Farnow, Inc.
Freeman Chemical Corp.
General Tire & Rubber Co., Chemical Div.
Goodyear Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Gulf Oil Corp., Petrochemicals Sales Office
Jones-Dabney Co Div., Devoe & Raynolds Co., Inc.
Mobay Chemical Co.
National Aniline Div., Allied Chemical Corp.
Naugatuck Chemical Div., U. S. Rubber Co.

Plastics Div., Allied Chemical Corp.
Schenectady Varnish Co.
Spencer Kellogg and Sons, Inc.
Trancoa Chemical Corp.
U.S. Coatings Co.
Union Carbide Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Silicones

Dow Corning Corp.
General Electric Co., Silicones Products Dept.
Plastics Div., Allied Chemical Corp.
Silicone Div., Union Carbide Corp.

Styrene Copolymers

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
The Borden Chemical Co.
Degen Oil & Chemical Co.
Dewey & Almy Chemicals, Div. of W. R. Grace & Co.
Dow Chemical Co.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Freeman Chemical Corp.
B. F. Goodrich Chemical Co.
Goodyear Tire and Rubber Co., Chemical Div.
Koppers Co.
Marbon Chemical Div. of Borg-Warner Corp.
Monsanto Chemical Co., Plastics Div.
Penna. Ind. Chem. Corp.
Reichhold Chemicals, Inc.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Union Carbide Plastics Co.
U. S. Rubber Co., Naugatuck Chemical Div.
Velsicol Chemical Corp.

Synthetic Rubber

The Borden Chemical Co.
E. I. du Pont de Nemours & Co., Elastomers Div.
Enjay Chemical Co., A Div. of Humble Oil and Refining Co.
B. F. Goodrich Chemical Co.
Marbon Chemical
Union Carbide Corp., Silicones Div.
United Carbon Co.
U. S. Rubber Co., Naugatuck Chemical Div.

Terpenes

Central Solvents and Chemical Co.
Crosby Chemical Co.
Glidden Co.
Hercules Powder Co.
Nelio Resins Inc.
Newport Industries Co., A Div. of Heyden-Newport Chemical Corp.
Pennsylvania Industrial Chemical Corp.
Schenectady Varnish Co.

Thixotropic Vehicles

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Jones-Dabney Co.
Koppers Co. Inc., Tar Products Div.
Spencer-Kellogg & Sons, Inc.
Reichhold Chemicals, Inc.
Fred'k Stresen-Reuter, Inc.
T. F. Washburn Co.

Ureas

American Cyanamid Co., Plastics & Resins Dept.
Borden Chemical Co.
Catalin Corp. of America
Central Solvents and Chemical Co.
Jones-Dabney Co.
Kraft Chemical Co.
Monsanto Chemical Co., Plastics Div.
Onyx Chemical Corp.
Plastics Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Vinyls

Archer-Daniels-Midland Co.
Borden Co., Chemical Div.
The California Ink Company, Inc.
Colton Chemical Co.
Diamond Alkali Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Firestone Plastics Co.
General Aniline & Film Corp.
General Tire and Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Inc.
Monsanto Chemical Co., Plastics Div.
Morningstar-Paisley Inc.
Shawinigan Resins Corp.
Union Carbide Plastics Co.

Vinyl Acetate Solutions

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Borden Chemical Co.
Cellofilm Industries, Inc.
Colton Chemical Co., A Div. of Air Reduction Co., Inc.
E. I. du Pont de Nemours & Co., Inc.
Farnow, Inc.
Firestone Plastics Co.
National Starch & Chemical Corp.
Onyx Chemical Corp.
Reichhold Chemicals, Inc.
Shawinigan Resins Corp.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Union Carbide Chemical Co.

Vinyltoluene Copolymers

Degen Oil & Chemical Co.
Spencer Kellogg & Sons, Inc.
Union Carbide Plastics Co.

Water Thinned Resins

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Plastics and Resins Div.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Catalin Corp. of America
Cargill, Inc.
Dewey and Almy Chemical, Div. W. R. Grace & Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Farac Oil and Chemical Co.
Farnow, Inc.
France, Campbell & Darling, Inc.
B. F. Goodrich Chemical Co.
Hercules Powder Co.
Key Chemicals Corp.
Midwest Synthetics Co.
Monsanto Chemical Co., Plastics Div.
National Starch & Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Shawinigan Resins Corp.
U. S. Coatings Co.
T. F. Washburn Co.

SOLVENTS
10

Alcohols

American Mineral Spirits Co.
Celanese Chemical Co.
Central Solvents & Chemical Co.
Chemical-Solvents Inc.
Colton Chemical Co., A Div. of Air Reduction Co., Inc.
Commercial Solvents Corp.
Dehydag-Deutsche Hydrierwerke GmBH
Dow Chemical Co.
Dow Badische
Eastman Chemical Products, Inc.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Gulf Oil Corp., Petrochemicals Dept. Sales Office
The Harshaw Chemical Co.
Mercury Chemical Corp.
Modern Solvents & Chemical Corp.
Reichhold Chemicals, Inc.
Union Carbide Chemical Co.
U. S. Industrial Chemical Co., Div. of National Distillers & Chemical Corp.
Western Solvents & Chemical Co.

Alicyclic

Allied Chemical Corp., National Aniline Div.
Phillips Petroleum Co.
Union Carbide Chemical Co.
Western Solvents & Chemical Co.

Aliphatic Hydrocarbons

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
Antara Chemicals, A Div. of General Aniline & Film Corp.
The Atlantic Refining Co.
Central Solvents & Chemical Co.

Chemical-Solvents, Inc.
Commercial Solvents Corp.
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Esso Standard, Div. of Humble Oil & Refining Co.
Gulf Oil Corp., Petrochemicals Dept Sales Office
Leonard Refineries, Inc.
Mercury Chemical Corp.
Mobil Oil Co.
Modern Solvents & Chemical Corp.
Neville Chemical Co.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
Union Carbide Chemical Co.
Western Solvents & Chemical Co.
Wyandotte Chemicals Corp.

Aromatic Hydrocarbons

American Mineral Spirits Co.
Amoco Chemical Corp.
Antara Chemicals, A Div. of Ceneral Aniline & Film Corp.
California Chemical Co., Oronite Div.
Central Solvents & Chemical Co.
Chemical-Solvents, Inc.
Continental Oil Co.
Cosden Petroleum Corp.
E. I. du Pont de Nemours & Co., Inc.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Esso Standard, Div. of Humble Oil Refining Co.
Gulf Oil Corp., Petrochemicals Dept. Sales Office
Koppers Co., Inc., Plastics Div.
Koppers Co., Inc., Tar Products Div.
Leonard Refineries,Inc.
Mercury Chemical Corp.
Mobil Oil Co.
Modern Solvents & Chemical Corp.
Neville Chemical Co.
Phillips Petroleum Co.
Pittsburgh Chemical Co., A Subsidiary of Pittsburgh Coke & Chemical Co.
Plastics Div., Allied Chemical Corp.
Signal Oil and Gas Co., Houston Div.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
Sun Oil Co.
Tennessee Products and Chemical Corp.
Union Carbide Chemical Co.
United States Steel Corp.
Velsicol Chemical Corp.
The Vickers Petroleum Co., Inc.
Western Solvents & Chemical Co.

Esters

American Mineral Spirits Co.
Celanese Chemical Co.
Central Solvents & Chemical Co.
Chemical Solvents Inc.
Colton Chemical Co., A Div. of Air Reduction Co., Inc.
Commercial Solvents Corp.
Eastman Chemical Products, Inc.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Mercury Chemical Corp.
Modern Solvents & Chemical Corp.
Union Carbide Chemical Co.
U. S. Industrial Chemical Co., Div. of National Distillers & Chemical Corp.
Western Solvents & Chemicals Co.

Ether—alcohols

American Mineral Spirits Co.
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
Modern Solvents & Chemical Corp.
Olin-Mathieson Chemical Corp.
Shell Chemical Co.
Union Carbide Chemical Co.
U. S. Industrial Chemical Co., Div. of National Distillers & Chemical Corp.
Western Solvents & Chemical Co.

Ethers and Polyethers

Central Solvents & Chemical Co.
The Dow Chemical Co.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Olin Mathieson Chemical Corp.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.
Wyandotte Chemical Corp.

Halogen-Containing

Central Solvents & Chemical Co.
Chemical-Solvents Inc.
Columbia-Southern Chemical Corp.
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Hooker Chemical Co.
Kraft Chemical Co.
Olin Mathieson Chemical Corp.
Union Carbide Chemical Co.
Wyandotte Chemicals Corp.

Ketones

American Mineral Spirits Co.
Celanese Chemical Co.
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
Eastman Chemical Products, Inc.
Enjay Chemical Co., A Div. of Humble Oil & Refining Co.
Mercury Chemical Corp.
Modern Solvents & Chemical Corp.
Shell Chemical Co.
Union Carbide Chemical Co.
U. S. Industrial Chemical Co., Div. of National Distillers & Chemical Corp.
Western Solvents & Chemical Co.

Naphthas

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
The Atlantic Refining Co.
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
Esso Standard, Div. of Humble Oil & Refining Co.
The Harshaw Chemical Co.
Koppers Co., Inc., Tar Products Div.
Leonard Refineries, Inc.
Mercury Chemical Corp.
Mobil Oil Co.
Modern Solvents & Chemical Corp.
Neville Chemical Co.
Plastics Div., Allied Chemical Corp.
Signal Oil and Gas Co., Houston Div.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
The Vickers Petroleum Co., Inc.
Western Solvents & Chemicals Co.

Naval Stores Solvents

Arizona Chemical Co.
Central Solvents & Chemical Co.
Crosby Chemical, Inc.
The Clidden Co.
Hercules Powder Co.
Mobil Oil Co.
Newport Industries Co., A Div. of Heyden-Newport Chemical Corp.
Southern Naval Stores Div.
Western Solvents & Chemical Co.

Nitroparaffins

Commercial Solvents Corp.

Odorless and Low-odor

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
The Atlantic Refining Co.
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
Esso Standard, Div. of Humble Oil Refining Co.
Leonard Refineries, Inc.
Mobil Oil Co.
Modern Solvents & Chemical Corp.
Phillips Petroleum Co.
Signal Oil and Gas Co., Houston Div.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
U. S. Industrial Chemical Co., Div. of National Distillers & Chemical Corp.
Western Solvents & Chemical Co.

Tetrahydrofuran

E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept.

PRODUCTION EQUIPMENT
11

Azeotropic Systems

Brighton Corp.
Blaw-Knox Co., Buflovak Equipment Div.
Process Engineering & Machine Co., Inc.

Ball & Pebble Mills

Abbe Engineering Co.
Paul O. Abbe, Inc.
Baker Perkins
Coors Porcelain Co.
Epworth Mfg. Co.
Fisher Scientific Co.
Kinetic Dispersion Corp.
Machinery & Equipment Company, Inc.
Patterson Foundry & Machine Co.
Southwestern Engineering Co.
Tri Homo Corp.
U. S. Stoneware Co.

Barrell Rollers

Abbe Engineering Co.
Paul O. Abbe, Inc.
Cleveland Mixer Co.
L. M. Gilbert Co.
U. S. Stoneware Co.

Terriss Div., Consolidated Syphon Supply Co.

Blenders
Abbe Engineering Co.
Paul O. Abbe, Inc.
B-I-F Industries, Inc.
Baker-Perkins, Inc., Chemical Machinery Div.
Blackmer Pump Co.
Bowser, Inc., Marketing Div.
Brighton Corp.
Cleveland Mixer Co.
Arthur Colton Co.
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.
Epworth Mfg. Co.
Gifford-Wood Co.
Herman Hockmeyer & Co.
Kent Machine Works, Inc.
Kinetic Dispersion Corp.
J. M. Lehmann Co., Inc.
Machinery & Equipment Company, Inc.
Mooney Machine Mfg. Co.
Franklin P. Miller Son, Inc.
Patterson Foundry & Machine Co.
Patterson-Kelley Co.
The Pfaudler Co., A Div. of Pfaudler Permutit Inc.
Read Standard Corp.
Rietz Mfg. Co.
Charles Ross & Son Co.
Star Tank & Filter Corp.
F. J. Stokes & Corp.
Terriss Div., Consolidated Siphon Supply Co.
Tri-Homo Corp.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Burners and Burner Settings
Selas Corp. of America

Can Casing Machines
Chisholm Ryder Co. of Pa.

Can Top Securing Clips
O. G. Innes Corp.
Sealwall Co.

Case Printing Machines
Chisholm Ryder Co. of Pa.

Case Sealing Machines
Chisholm Ryder Co. of Pa.

Cleaning Tools and Machines
L. M. Gilbert Co.
Karl Kiefer Machine Co.
U. S. Air Tool Co.

Colloid Mills
Abbe Engineering Co.
Gifford-Wood Co.
Kinetic Dispersion Corp.
Machinery & Equipment Company, Inc.
Manton-Gaulin Mfg. Co., Inc.
Franklin P. Miller & Son, Inc.
Morehouse-Cowles, Inc.
The Pfaudler Co.
Phillips Assn.
Premier Mill Corp.
Chas. Ross & Son Co.
Tri-Homo Corp.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Compressors
Beach Russ Co.

Carbon Dioxide
C. M. Kemp Mfg. Co.
General Dynamics Corp., Liquid Carbonic Div.

Coding Machines
Arthur Colton Co.
Kiwi Coders Corp.
J. M. Lehmann Co.
James H. Matthews & Co.
Phillips Assn.

Crushers, Choppers
Franklin P. Miller & Sons, Inc.

Cutters, Rotary
Abbe Engineering Co.

Delumpers
Franklin P. Miller & Sons, Inc.

Direct-Fired Furnace
Blaw-Knox Co., Chemical Plant Div.

Dissolvers
Abbe Engineering Co.
B-I-F Industries, Marketing Div.
Baker-Perkins Inc., Chemical Machinery Div.
Brighton Corp.
Cleveland Mixer Co.
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.
Epworth Mfg. Co., Inc.
Gifford-Wood Co.
Herman-Hockmeyer & Co.
Kent Machine Works

Kinetic Dispersion Corp.
Machinery & Equipment Company, Inc.
Mooney Machine Mfg. Co.
Morehouse-Cowles, Inc.
Patterson-Foundry & Machine Co.
Phillips Assn.
Premier Mill Corp.
Charles Ross & Son Co.
Shar Dispersion Equip. Co., Inc.
Terriss Div., Consolidated Siphon Supply Co.
Tri-Homo Corp.

Dowtherm Kettles

Brighton Corp.
Blaw-Knox Co., Chemical Plastics Div.
Blaw-Knox Co., Buflovak Equipment Div.
Cleveland Mixer Co.
Machinery & Equipment Company, Inc.
Patterson Foundry and Machine Co.
Phillips Assn.

Process Eng. & Mach. Co.
Star Tank & Filter Corp.

Drum Reconditioners

L. M. Gilbert Co.
Pangborn, Corp.
Phillips Assn.
Wheelabrator Corp.

Drum Mixers

Abbe Engineering Co.
Paul O. Abbe, Inc.
Cleveland Mixer Co.
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.
Kent Machine Works Inc.
Phillips Assn.
Chas. Ross & Son Co.
F. J. Stokes Corp.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Drum Rollers

Abbe Engineering Co.
Paul O. Abbe, Inc.
Cleveland Mixer Co.
L. M. Gilbert Co.
Mooney Machine Mfg. Co.
Phillips Assn.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Drum Warmers

Harold L. Palmer Co.

Dryers

Blaw-Knox Co., Buflovak Equipment Div.

Dust Removal Systems

B.I.F. Industries, Inc.
Machinery & Equipment Company, Inc.
Pangborn Corp.
Claude B. Schneible Co.
U. S. Stoneware Co.
Wheelabrator Corp.

Energy Grinding Mills

Southwestern Eng. Co.

Feeders

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Elgin Mfg. Co.

Filling Machines

C. M. Ambrose Co.
Bowser, Inc., Marketing Div.
Chisholm Ryder Co. of Pa.
Arthur Colton Co., Div. of Snyder Corp.
Elgin Mfg. Co.
Filpaco Industries, Inc.
Karl Kiefer Machine Co.
Oil Equipment Laboratories, Inc.
Phillips Assn.
Machinery & Equipment Company, Inc.
T. R. Mantes Company

Filters

American Felt Co.
Bowser, Inc., Marketing Div.
Cuno Engineering Corp.
Filpaco Industries Inc.
Filter Fabrics Inc.
Hercules Filter Corp.
Komline Sanderson Eng. Corp.
Process Filters, Div. of Bowser, Inc.
Read Standard, Div. of Capitol Products Corp.
Sparkler Mfg. Co.
Star Tank & Filters Corp.
Terriss Div., Consolidated Siphon Supply Co.

Filtering Aids

Eagle-Picher Co.
Great Lakes Carbon Mining & Mineral Products Div. Corp.
Hercules Filter Corp.
Johns-Manville Sales Corp.
Komline-Sanderson Eng. Corp.
Machinery & Equipment Company, Inc.
Sparkler Mfg. Co.
Star Tank & Filter Corp.

Filter Press

Biach Industries, Inc.
Filpaco Industries Inc.
Hercules Filter Corp.
Machinery & Equipment Company, Inc.
Patterson Foundry & Machine Co.
Process Filters, Div. of Bowser, Inc.
Sparkler Mfg. Co.
Star Tank & Filter Corp.
Terriss Div., Consolidated Siphon Supply Co.

Fume Removal Systems

Brighton Corp.
Catalytic Combustion Corp.
Doyle Vacuum Cleaner Co.
Claude B. Schneible Co.
Schutte and Koerting Co.
U. S. Stoneware Co.
Wheelabrator Corp.

Gas Boosters

Beach-Russ Co.

Gas Burners (Radiant)

Selas Corp. of America

Gaskets

Paul O. Abbe, Inc.
American Felt Co.
Johns-Manville Corp.
U. S. Stoneware Co.

Grinding Media

Abbe Engineering Co.
Paul O. Abbe, Inc.
Coors Porcelain Co.
Diamonite Products Mfg. Co.
Epworth Mfg. Co.
Kent Machine Works, Inc.
LZP Industrial Ceramics Co.
McDanel Refractory Porcelain Co.
Ohio Kilns
Patterson Foundry and Machine Co.
Porcelain Div. of Ferro Corp.
Pennebacker Co., Inc.
Charles Ross & Son Co., Inc.
F. J. Stokes Co.
U. S. Stoneware Co.

Homogenizer
Manton-Gaulen Mfg. Co.

Inert Gas Generators
C. M. Kemp Mfg. Co.
General Dynamics Corp., Liquid Carbonic Div.
Machinery & Equipment Company, Inc.
Selas Corp. of America

Jar Rolling Machines
Abbe Engineering Co.
Paul O. Abbe, Inc.
Coors Porcelain Co.
Epworth Mfg. Co.
Fisher Scientific Co.
McDanel Refractory Porcelain Co.
Mooney Machine Mfg. Co.
Patterson Foundry and Machine Co.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Labelling Machines
Burt Machine Co., Inc.
Chisholm-Ryder Co. of Pa.
King Sales & Engineering Co.
Labelette Co.
Machinery & Equipment Company, Inc.
Phillips Assn.

Laboratory Mills
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.

Laboratory Jar Rolling Mills
Abbe Engineering Co.
Paul O. Abbe, Inc.
Coors Porcelain Co.
Epworth Mfg. Co., Inc.
Fisher Scientific Co.
McDanel Refractory Porcelain Co.
Ohio Kilns
Patterson Foundry and Machine Co.
Chas. Ross & Son Co.
U. S. Stoneware Co.

Liquid Depth Indicators
The Foxboro Co.
Gulf Oil Corp., Petrochemicals Sales Office
Komline Sanderson Engineering Corp.
Liquidometer Corp.
Petrometer Corp.

Meters
B.I.F. Industries
Bowser, Inc., Marketing Div.

Mill Head Assemblies
Epworth Mfg. Co., Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Chas. Ross & Son Co.
Tri-Homo Corp.

Mill Jars
Abbe Engineering Co.
Paul O. Abbe Co.
Coors Porcelain Co.
Fisher Scientific Co.
Gulf Oil Corp., Petrochemicals Sales Office
McDanel Refractory Porcelain Co.
Ohio Kilns
Patterson Foundry and Machine Co.
Porcelain Div., Ferro Corp.
U. S. Stoneware Co.

Mill Linings
Abbe Engineering Co.
Paul O. Abbe, Inc.
Coors Porcelain Co.
Diamonite Products Mfg. Co.
Gulf Oil Corp., Petrochemicals Sales Office
LZP Industrial Ceramics Co.
McDanel Refractory Porcelain Co.
Ohio Kilns
Patterson Foundry & Machine Co.
Pennebacher Co., Inc.
Porcelain Div., Ferro Corp.
U. S. Stoneware Co.

Mixers & Agitators
Abbe Engineering Co.
Paul O. Abbe, Inc.
Baker-Perkins, Inc., Chemical Machinery Div.
Blaw-Knox Co., Buflovak Equip. Div.
Brighton Corp.
Brookfield Engineering Labs., Inc.
Chisholm-Ryder Co. of Pa.
Cincinnati Hilderbrand Co.
Cleveland Mixer Co.
Arthur Colton Co.
J. H. Day Co., Div. Cleveland Automatic Machine Co.
Eastern Industries, Inc.
Epworth Mfg. Co.
Filpaco Industries, Inc.
Gifford-Wood Co.
Gulf Oil Corp., Petrochemicals Sales Office
Herman Hockmeyer & Co.
International Engineering Corp.
Jensen Engineering Co.
Kent Machine Works, Inc.
Kinetic Dispersion Corp.
J. H. Lehmann Co., Inc.
Machinery & Equipment Company, Inc.
Franklin P. Miller & Son Co.
Mixing Equipment Co.
Mooney Machine Mfg. Co.
Neumann & Weaver, Inc.
Patterson Foundry & Machine Co.
Phillips Assn.
Premier Mill Corp.
Read Standard Corp.
Rietz Mfg. Co.
Charles Ross & Son Co.
Star Tank & Filter Corp.
F. J. Stokes Corp.
Terriss Div., Consolidated Siphon Supply Co.
Tri-Homo Corp.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Paint Cleaning Tool
U. S. Air Tool Co.

Pigment Shearing & Disperser
Shar Dispersion Equipment Co., Inc.

Positive Displacement Meter
B-I-F Industries

Bowser, Inc., Marketing Div.
Granberg Corp., Subsidiary of American Meter Co., Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Neptune Meter Co., Liquid Meter Div.

Pulverizers
Franklin P. Miller & Sons, Inc.

Pumps
Abbe Engineering Co.
Beach-Russ Co.
B-I-F Industries
Blackmer Pump Co.
Filpaco Industries, Inc.
Foster Pump Works, Inc.
L. M. Gilbert Co.
Granberg Corp., Subsidiary of American Meter Co., Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Kamaline-Sanderson Eng. Corp.
Machinery & Equipment Company, Inc.
Manton-Gaulin Manufacturing Co., Inc.
Neumann & Weaver, Inc.
Phillips Ass.
Sparkler Mfg. Co.
F. J. Stokes Co.

Refractories (Heating)
Eagle-Picher Co.
Johns-Manville Corp.
Gulf Oil Corp., Petrochemicals Sales Office
Ohio Kilns
Selas Corp. of America
Terriss Div., Consolidated Siphon Supply Co.
Wallace & Tiernan

Resin & Varnish Kettles
Blaw-Knox Co., Buflovak Equip. Div.
Blaw-Knox Co., Chemical Plants Div.
Brighton Corp.
Cleveland Mixer Co.
Epworth Mfg. Co.
Filpaco Industries Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Machinery & Equipment Company, Inc.
Patterson Foundry & Machine Co.
The Pfaudler Co., A Div. of Pfaudler Permutit Inc.
Process Engineering & Machine Co.
Charles Ross & Son, Inc.
Star Tank & Filter Corp.

Rollers for Barrels
Abbe Engineering Co.
Paul O. Abbe, Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Roller Mills
Buhler Corp.
Chemical & Pharmaceutical Industry Co., Inc.
J. H. Day Co., Div. of Cleveland Automatic Machine Co.
Gulf Oil Corp., Petrochemicals Sales Office
Kent Machine Works, Inc.
J. M. Lehmann Co., Inc.
Machinery & Equipment Company, Inc.
Franklin P. Miller & Sons
Tri-Homo Corp.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Safety Containers
Protectoseal Co.

Sand Grinders
Chicago Boiler Co.
Epworth Mfg. Co.

Sieving & Screening Machines
Abbe Engineering Co.
J. H. Day Co., Div. of Cleveland Automatic Machine Co.
Gulf Oil Corp., Petrochemicals Sales Office
J. M. Lehmann Co., Inc.
Machinery & Equipment Company, Inc.
Patterson Foundry and Machine Co.
Southwestern Eng. Co.
Terriss Div., Consolidated Siphon Supply Co.
Tri-Homo Corp.

Specific Gravity Indicator

Gulf Oil Corp., Petrochemicals Sales Office
Petrometer Corp.

Storage Tanks

Epworth Mfg. Co.

Strainers

C. M. Ambrose Corp.
American Felt Co.
Bowser, Inc., Marketing Div.
Cuno Engineering Corp.
Granberg Corp., Subsidiary of American Meter Co., Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Process Engineering & Machine Co.
Reliable Strainer Mfg. Co.
Star Tank & Filter Corp.
Tri-Homo Corp.

Sub-Micron Disperser

Manton-Gaulin Mfg. Co.

Synthetic Resin Plant

Brighton Corp.
Patterson Foundry & Machine Co.
Star Tank and Filter Corp.

Temperature Controls

The Partlow Corp.

Thinning & Tinting Tank

Paul O. Abbe, Inc.
Brighton Corp.
Cincinnati Hildebrand Co.
Cleveland Mixer Co.
J. H. Day Co.
Epworth Mfg. Co.
Filpaco Industries, Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Herman Hockmeyer Co.
Kent Machine Works, Inc.
Mooney Machine Mfg. Co.
Patterson Foundry & Machine Co.
Process Engineering Machine Co.
Read Standard, Div. of Capitol Products Corp.
Charles Ross & Son Co.
Reliable Strainer Mfg. Co.
Terriss Div., Consolidated Siphon Supply Co.

Tumblers

Abbe Engineering Co.
Paul O. Abbe, Inc.
Cleveland Mixer Co.
General Dynamics Co., Liquid Carbonic Div.
Gulf Oil Corp., Petrochemicals Sales Office
Charles Ross & Son Co.
U. S. Stoneware Co.

Used Equipment

Gulf Oil Corp., Petrochemicals Sales Office
J. M. Lehmann Company, Inc.
Machinery & Equipment Co., Inc.
Chas. Ross & Son Co.

Valves

Neumann & Weaver, Inc.

Vibration Insulation

American Felt Co.

Weighers

B-I-F Industries

Sub Micron Disperser

Manton-Gaulin Mfg. Co., Inc.

MATERIAL HANDLING
12

Barksdale Company
Barrett-Cravens Co.
Carrier Conveyor Corporation
Clark Equipment Company
J. H. Day Co., Div. of Cleveland Automatic Machine Co.
The Elwell-Parker Electric Company
Sterling Fleischman Co.
Gifford-Wood Co.
Hyster Company
Machinery & Equipment Company, Inc.
Market Forge Company
Mercury Handling Systems
Neptune Meter Company
Phillips Assn.
Protectoseal Co.
The Rapids-Standard Co., Inc.
Read Standard Corporation
Revolvator Company
Stewart-Warner Corporation
Terriss Div., Consolidated Siphon Supply Co.
Towmotor Corp.
Yale & Towne Mfg. Co.

CONTAINERS
PAILS and CANS
13

Aluminum Co. of America
American Can Co., Canco Div.
Bennett Industries, Inc.
Central Can Co., Inc.
Continental Can Co., Inc.
Crown Cork & Seal Co.
The Davies Can Co.
Geuder-Paeschke & Frey Co.
Inland Steel Container Co.
Jones & Laughlin Steel Corp.
T. F. McAdam, Inc.
George A. Milton Can Co., Inc.
National Can Corp.
National Steel Container Co.
Pressed Steel Tank Co.
Rheem Mfg. Co.
Southwestern Steel Container Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Stern Can Co.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Hoffman Can Corp.
U. S. Steel Products Div., U. S. Steel Corp.
Vulcan Container, Inc.
Vulcan-Associated Container Companies, Inc.

CAN CLIPS
13A

Freund Can Co.
O. G. Innes Corp.
Sealwall Co.

TESTING EQUIPMENT
14

Atlas Electric Devices Co.
Bausch & Lomb Optical Co.
Beckman Instruments
C. W. Brabender Instruments, Inc.
Brookfield Engineering Laboratories, Inc.
Burrell Corp.
Coleman Instruments Inc.
J. H. Day Co., Div. of Cleveland Automatic Machine Co.
Erichsen
Fisher Scientific Co.
M. F. Fawcett Co.
Gardner Laboratory, Inc.
General Electric Co., Instrument Dept.
The Emil Greiner Co.
Hellige, Inc.
Instrument Development Labs., Inc.
International Testing Laboratories, Inc.
Macbeth Daylighting Corporation
Manufacturers Engineering & Equipment Corp.
Morest Co.
Norcross Corp.
Partlow Corp.
Photovolt Corp.
Precision Gage & Tool Co.
Precision Scientific Co.
Taber Instrument Corp.
Unit Process Assemblies, Inc.
United States Testing Co., Inc.
Universal Aviation Equip., Inc.

COLOR CARDS
15

Bowles Printing Corp.
Colwell Press, Inc.
Carl Gorr Color Cards, Inc.
Mahwah Color Co., Inc.
Matherson-Selig Company
Strobridge Color Card
White Color Card

•

Epoxy Coating for Private Label

D. J. Peterson
Box 181F
Sheboygen, Wis.

•

Testing Service and Facilities

Sub-Tropical Testing Service, Inc.
8290 S. W. 120th St.
P. O. Box 898
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How the magic touch of aerosol packaging skyrockets sales!

Today, such handy "do-it-yourself" aerosol products as paints, protective coatings, stains, fillers, car polishes, waterproofing sprays and many others are making jobs easier, quicker and neater. Tomorrow, who knows what *new* aerosol products will capture the fancy of consumers in this important market?

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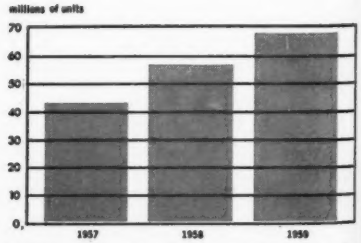

Aerosol paint and protective coating sales, for example, have climbed 58.7%* in just 3 years!

*Estimated by Market Surveys Department, General Chemical Division, Allied Chemical Corporation.

genetron®
aerosol propellants

Putting the "push"
in America's finest aerosols

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

For more information circle No. 98—last page

AEROSOL SUPPLIERS' DIRECTORY

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AGITATING BALLS

Sterling Commercial Steel Ball Corp.
Box 401
Sterling, Ill.

ANHYDROUS SOLVENTS

U. S. Industrial Chemicals Co.
Div. of National Distillers and Chemical Corp.
New York 16, N. Y.

CAN UNSCRAMBLERS

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Blettner Ave.
Hanover, Pa.

★ARTHUR COLTON CO., DIV.
Snyder Tool & Engineering Co.
3598 E. Lafayette
Detroit 7, Mich.

Food Machinery & Chemical Corp.
342 W. Julian St.
San Jose 6, Calif.

Mojonnier Associates, Inc.
9151 Fullerton Ave.
Franklin Park, Ill.

Phillips Associates
6003 Market
Oakland 8, Calif.

CAPPING EQUIPMENT

Arenco Machine Co.
25 W. 43rd St.
New York 36, N. Y.

Builders Sheet Metal Works, Inc.
108 Wooster St.
New York 12, N. Y.

Burt Machine Co.
401 E. Oliver St.
Baltimore 2, Md.

Filpaco Industries, Inc.
2548 S. Michigan Ave.
Chicago 16, Ill.

Oil Equipment Labs, Inc.
600 Pearl St.
Elizabeth 4, N. J.

Phillips Associates
6003 Market
Oakland 8, Calif.

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420 Monceaux Rd.
P. O. Box 2587
West Palm Beach, Florida

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Ribelin Distributors, Inc.
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Atlanta 5

ILLINOIS
Philip E. Calo Co.
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Portland 10

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Adiprene—Liquid urethane rubber. **E. I. du Pont de Nemours & Co.**
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Atlas—Dry colors. **H. Kohnstamm & Co., Inc.**

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Beckamine—Urea-formaldehyde resins. **Reichhold Chemicals, Inc.**

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Calwhite—Calcium carbonate pigment. **The Georgia Marble Co.**

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Carbium—Precipitated calcium carbonate. **Diamond Alkali Co., Silicate-Detergent-Calcium Div.**

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Carbolac—Channel carbon blacks. **Godfrey L. Cabot, Inc.**

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Cargoils—Fish oil based oils for barn paints. **Cargill, Inc.**

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Castung—Dehydrated castor oil. **Baker Castor Oil Co.**

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Cataline—Reflective Striping Compound. **Cataphote Corp.**

Cataphote—Pavement marking glass beads—**Cataphote Corp.**

Cataphote V-S-R—Kits. **Cataphote Corp.**

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Ceraweld—Additives. **Bareco Wax Co. Div. of Petrolite Corp.**

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Chempol—Resins. **Freeman Chemical Corp.**

Chemstor—Glass lined storage tanks. **The Pfaudler Company**

Cherokee—Kaolin Clay. **R. T. Vanderbilt Co.**

Chlorotehene—Solvent. **Dow Chemical Co.**

Chlorowax 40—Plasticizer; liquid chlorinated paraffin. **Diamond Alkali Company**

Chlorowax 70—Resinous chlorinated paraffin. **Diamond Alkali Company**

C.I.—Coumarone-indone resin. **Neville Chemical Co.**

Cicoil—Oiticica oil. **Brazil Oiticica, Inc.**

Cicolate—Driers. **California Ink Co., Inc.**

Cicosol—Driers. **California Ink Co., Inc.**

Cidao—Oiticica and castor oils. **Brazilian Industrial Oils, Inc.**

Cincinnatus—Mixer. **The J. H. Day Company.**

Citation Red—Permanent red 2-B, BON type. **Kentucky Color & Chemical Company**

Citro Deodorant—Paint deodorant. **Florida Molasses Corporation**

Citroflex—Citric acid ester plasticizers. **Chas. Pfizer & Co., Inc.**

CKR—Heat and non-heat hardening phenolic resins. **Union Carbide Plastics Co.**

CKV—Phenolic dispersions. **Union Carbide Plastics Co.**

Claw—Mixing propeller. **Craddock Equipment Co., Inc.**

Clearate—Lecithin. **W. A. Cleary Corp.**

CMC—Sodium carboxymethylcellulose. **Hercules Powder Company**

Coacetateblak—Carbon black cellulose acetate chips. **Columbian Carbon Co.**

Coacrylateblak—High color carbon black. **Columbian Carbon Co.**

Cobalt 254—Loss of dry inhibitor. **Nuodex Products Company, Inc.**

Cobalt Blue PN922—Cobalt aluminate. **The Harshaw Chemical Co.**

Coblac—Carbon black nitrocellulose dispersions **Columbian Carbon Co.**

Codispersion—Carbon black dispersions in various vehicles. **Columbian Carbon Co.**

Coethloblak—Black in ethyl cellulose. **Columbian Carbon Co.**

Cofar—Acrylic-vinyl latex. **Farnow, Inc.**

C-Oil—Hydrocarbon drying oil. **Enjay Company, Inc.**

Cold-Pro—Bleached Shellac. **Acme Shellac Products Company**

Colitic F—Calcium carbonate. **DeLore Div., National Lead Co.**

Colloresine — Sodium Carboxymethylcellulose. **General Aniline & Film Corp.**

Cololdex—Surface treated carbon blacks. **Columbian Carbon Co.**

Color Pax—Tinting colors. **California Ink Co., Inc.**

Color trend—Universal dispersions. **California Ink, Co., Inc.**

Common Sense—Disc filter. **Filpaco Industries**

Conaform—Vacuum Dryer. **The Patterson Foundry and Machine Company**

Concord—Wet ground mica. **Concord Mica Corp.**

Concord Maroon—Deep BON Maroon. **Standard Ultramarine & Color Company**

Conoco—Petroleum solvent. **Continental Oil Co.**
Connectite—Impregnated Felt Seals. **American Felt Co.**
Continental—Carbon Blacks. **Witco Chemical Company**
Continental—Kaolin Clay. **R. T. Vanderbilt Company**
Continex—Furnace carbon black. **Witco Chemical Company**
Coors—High density grinding media. **LZP Industrial Ceramics**
Coresin blak—Black paste. **Columbian Carbon Co.**
Corial—Finishing agents. **General Aniline & Film Corp.**
Cosden—Solids. **Cosden Petroleum Corp.**
Cosden Polyvis—Polybutene. **Cosden Petroleum Corp.**
Cosol—High-flash naphtha. **Neville Chemical Company**
Covarnish blak—Dry powders. **Columbian Carbon Co.**
Covertex—Vehicles for emulsion paints and latex. **McCloskey Varnish Company**
Covinylblak—Dry chips. **Columbian Carbon Co.**
Cowles—Mixers. **Morehouse-Cowles Inc.**
CP Toluidine Maroon MT-1—Toluidine maroons. **Harmon Colors**
CP Toluidine Toner RT-1—Toluidine reds. **Harmon Colors**
CPH—Softeners. **The C. P. Hall Co. of Illinois.**
CRCO—New Way—Labelling and packaging machines. **Chisholm-Ryder Co. of Pennsylvania**
Crilicon—Acrylic Emulsion. **Jersey State Chemical Co.**
Crosby—Maleic modified ester resin. **Crosby Chemicals, Inc.**
Crypton ZS—Zinc sulfide. **New Jersey Zinc Co.**
Cryptone—Zinc sulfide. **New Jersey Zinc Co.**
Crystal O—Castor Oil. **Baker Castor Oil Co.**
CTLA—Heat-reactive, aromatic-type olefinic hydrocarbon polymer. **Enjay Company, Inc.**
Cumar—Paracoumarone-indene resins. **Plastics Chemicals Div., Allied Chemical Corp.**
Cunilate—Fungicides. **Scientific Oil Compounding Company, Inc.**
Cunimene—Fungicides. **Scientific Oil Compounding Company, Inc.**
Cuprous Oxide—Anti-fouling copper pigment. **The Glidden Co.**
Cyan Blue—Phthalocyanine blue. **American Cyanamid Co., Pigment Div.**
Cyanadur—Organic yellow pigment. **American Cyanamid Co. Pigments Div.**
Cyanegg—Sodium cyanide. **E. I. du Pont de Nemours & Company, Inc.**
Cyanogum—Gelling agent. **American Cyanamid Co., Commercial Development Div.**
Cyaqua—Alkyd emulsion. **American Cyanamid Co., Plastics and Resin Div.**
Cyclodex—An emulsifiable cobalt catalyst. **Nuodex Products Company, Inc.**
Cyclosit—Cyclized Rubber—**Naftone, Inc.**
Cyclo Sol—Aromatic Solvents. **Shell Oil Company**
Cyclowhirl—Portable mixer. **The Kwerel Co.**
Cycolac—Styrene copolymer resin. **Marbon Chemical Division**
Cycopol—Copolymer Resins. **American Cyanamid Company**
Cykel—Dicyclopentadiene treated vegetable oil. **Spencer Kellogg & Sons, Inc.**
Cykelin—Dicyclopentadiene treated linseed oil. **Spencer Kellogg & Sons, Inc.**
Cykelsoy—Dicyclopentadiene treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Cymel—Alkylated melamine-formaldehyde resins. **American Cyanamid Co.**
Cyazc—Hard resin. **American Cyanamid Co. Plastics and Resins Div.**
C-8—Epoxy resins. **Union Carbide Plastics Co.**
C-10—Emulsion additive. **Apex Chemical Co.**
C-12—Resin for emulsions. **Farnow, Inc.**

D

D.E.N.—Dow Expoxy novolac. **The Dow Chemical Co.**
D.E.R.—Epoxy resins. **Dow Chemical Co.**
D-Gel—Viscosity controller. **Degen Oil & Chemical Co.**
Dag—Colloidal graphite dispersions. Acheson Colloids Company
Dapon—Diallyl phthalate prepolymer. **Ohio-Apex Division**
Darasol—Non-flammable vehicle for aerosol application. Chlorinated Products Div., **Diamond Alkali Co.**
Darex Copolymer—Styrene Butadiene Copolymer. **Dewey & Almy Chemical Co.**
Darex D10P—Chemical Plasticizers. **Dewey & Almy Chemical Company**
Darex Everflex—Polyvinyl Acetate emulsion. **Dewey & Almy Chemical Company**
Darsol—Metal cleaner. **Decar Chemical Products Company**
Darvan—Dispersing Agents. **R. T. Vanderbilt Company**
Davenite—Water ground mica. **Hayden Mica Company**
Daxad—Dispersing Agent. **Dewey & Almy Chemical Co.**
Day—Mixers and roll mills. **J. H. Day Co.**
DB—Urethane grade castor oil. **Baker Castor Oil Co.**
Dearborn Red—Red pigments. **Sherwin-Williams Co.**
Decalin—Solvent. **E. I. du Pont de Nemour & Co., Inc.**
Decroline—Zinc sulfoxylate formaldehyde. **General Aniline & Film Corp.**
Defoamer ED—Anti-Foam Agent. **El Dorado Oil Works**
Defoama—Anti-foaming agent. **Scher Bros.**
Defoamer Ed—Anti Foams. **Foremost Food & Chemical Co.**
Dehydol—Nonionic surface active agent. **Fallek Products Company, Inc.**
Dehydrol—Dehydrated Castor Oil. **Sherwin-Williams Co.**
Dehysol — Anti-Sagging Agent. **Dehydag-Deutsche Hydrierwerke GmbH.**
DEO Oil—Deodorized fish oil. **Pacific Vegetable Oil Corp.**
Deodorized Apco—Deodorized aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corp.**
Deoxidine—Metal cleaners and rust removers. **American Chemical Paint Company**
Deriphat—Amphoteric surfactants. **General Mills Inc. Chemical Division.**
Dermitron—Thickness tester. **Unit Process Assemblies, Inc.**
Detrex 79—Cleaner & phosphate treatment for steel. **Detrex Corporation**
D.G.—Magnesium Silicate. **Tamms Industries, Inc.**
Diam—Fatty diamines—**General Mills, Inc. Chemical Div.**
Diamond K—Oxidized oils. **Spencer Kellogg & Sons, Inc.**
Diamonite—High Alumina Ceramics. **Diamonite Products Mfg. Co.**
Dianol—Insecticide additive. **Dianol Div., Mills-Pearson Corp.**
Dianol—Insecticides, Mildewcides, Anti Fouling Compounds. **Dianol Div. Mills-Pearson Corp.**
Diazopon—Dispersing agent. **General Aniline & Film Corp.**
Dicalite—Diatomaceous Silica extender pigment. **Great Lakes Carbon Corporation**
Dicom—Dipentene. **Newport Industries, Inc.**
Dinopol—Plasticizer—**Chemical & Plastics Div. Food Machinery & Chemical Corp.**
Dipentek—Dipentaerythritol technical. **Heyden Chemical Corporation**
Dipentene No. 122—Solvent—51% dipentene with other terpene hydrocarbons. **Hercules Powder Company**
Diphenolic Acid—Intermediate. **S. C. Johnson & Son, Inc.**
DiscPerser—Mixer. **Herman Hockmeyer & Co.**
Dispersa Gen—Soy dispersing agent. **General Mills, Inc.**
Disperse—Aqueous phase dispersant. **Raybo Chemical Company**
Dispersators—Mixers. **Premier Mill Corp.**
Disperso—Wettable metallic stearates. **Witco Chemical Company**
Dispersol—Insecticide base. **Shell Oil Company**
Dispersoll—Slurry, Paster Misers. **Abbe Engineering Co.**
Dixie Perfecto—Carbon Black. **United Carbon Company, Inc.**
Dixie Reds—Toluidine and Para Substitutes. **Standard Ultramarine & Color Company**
DMT—Dimethyl terephthalate. **Hercules Powder Company**
Doubl—Limed wood rosin. **Newport Industries, Inc., Div. of Heyden-Newport Chem. Corp.**
Doubletite—Round friction top paint cans. **American Can Co.**
Dowanol—Glycol ether solvents—**The Dow Chemical Co.**
Dow Corning—Silicones. **Dow Corning Chemical Co.**
Dowex—Dow ionic change resins. **The Dow Chemical Co.**
Dowfax—Surface active agent. **Dow Chemical Co.**
Dow Latex—Emulsion of either vinyl chloride, vinylidene chloride copolymer, styrene-butadiene copolymer, or polyvinylidene chloride. **The Dow Chemical Company**
Dowicides—Industrial germicide & fungicides. **Dow Chemical Company**
Dowtherm—Dow Aromatic Compounds for heat transfer. **The Dow Chemical Co.**
DPA—Intermediate. **S. C. Johnson & Son, Inc.**
Drapex—Epoxy stearate plasticizer. **Argus Chemical Corp.**
Drarex—Plasticizer. **Argus Chemical Corp.**
Dresinate—Surface active sodium and potassium salts of rosins and tall oil. **Hercules Powder Company**
Dri-Film—Silicone water-repellents. **General Electric Co.**
Drisoy—Treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Dry tain—Dry inhibitor. **Raybo Chemical Co.**
Drarex—Plasticizer. **Argus Chemical Corp.**
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Drisoy—Treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Drytain—Dry inhibitor. **Raybo Chemical Co.**
Duol—Resinated Lithol Rubine pigment. **E. I. du Pont de Nemours & Company, Pigments Dept.**
Duomeens—N-Alkyl Trimethylene diamines. **Armour Industrial Chemical Co.**
Duplex Disperser—Mixer disperser. **Troy Engine & Machine Co.**
Duplicane #715—Sugar can wax. **Warwick Wax Company, Inc.**
Duponol—surface active agent—**E. I. du Pont de Nemours & Co. Inc.**
Duradiant—Burners. **Selas Corp. of America**
Duramac—Oil modified alkyds. **McWhorter Chemicals, Inc.**
Dura-Mill—Jar mill. **Patterson Foundry & Machine Co.**
Duraplex—Phthalic alkyd resins. **Rohm & Haas Company**
Dura-Prime—Steel drum surface preparation. **Bennett Industries, Inc.**
Duratone Reds—Toluidine and Para Substitutes. **Standard Ultramarine & Color Company**
Durez—Phenol-formaldehyde resin. **Durez Plastics & Chemical, Inc.**
Dur Oxyn—Isophthalic alkyd. **Specialty Resin Co.**
Duroxon—Soft Waxes. **Dura Commodities Corporation**
Dustex Micro-Silica—Soft amorphous silica. **Tamms Industries, Inc.**
Dutch Boy—Pigments—antimony oxide, calcium carbonate, barytes, white lead, red lead, litharge linseed oils, chemical plasticizers. **National Lead Company**
Dutch Boy—White Lead. **National Lead Co.**
Dutrex—Rubber plasticizers, softeners and extenders. **Shell Oil Co.**
Dyal—Alkyd resin. **Sherwin-Williams Co.**
Dylan—Polyethylene. **Koppers Company, Inc.**
Dylex K-34—Styrene butadiene latex. **Koppers Company, Inc.**
Dymal—Maleic resin. **Sherwin-Williams Co.**
Dymerex—Dimerized wood rosin. **Hercules Powder Company**
Dypenite—Modified phenolic resin. **The Sherwin-Williams Co.**
Dyphene—Phenolic resin. **Sherwin-Williams Co.**
Dyphenite—Phenolic resins. **Sherwin-Williams Co.**
Dyphos—Stabilizers for vinyls. **National Lead Company**
Dypol—Polyester resins. **Sherwin-Williams Co.**
D81—Epoxy plasticizer. **Dehydag Deutsche Hydrierwerke GMBH**

E

Eagle-Picher—Lead and Zinc Pigments. **The Eagle Picher Company**
Easy Ride—Conveyors. **Filpaco Industries**
Edenol—Plasticizers. **Dehydag Deutsche Hydrierwerke GMBH**
EGD—Acrylic Monomer. **American Monomer Corporation**
EHEC—Ethylated hydroxethyl cellulose. **Hercules Powder Company**
EKS, EKR, ERL—Epoxy resins. **Union Carbide Plastics Co.**
Elastex 49-P—Butyl iso decyl phthalate plasticizer. **Plastics Div., Allied Chemical Corp.**
Eldifoam. Antifoams. **Foremost Food and Chemical Co.**
Eldo—Fatty acids. **El Dorado Div., Foremost Food and Chemical Co.**
Eldoplast—Plasticizer. **Foremost Food & Chemical Co.**
El Dorado—Tinting colors. **California Ink Co., Inc.**
Electro-Vapor—Dowtherm Kettles. **Blaw-Knox Co.**
Elf—Chemical carbon blacks. **Godfrey L. Cabot, Inc.**
Elftex—Oil furnace carbon blacks. **Godfrey L. Cabot, Inc.**
Elvacet—Polyvinyl acetate emulsion. **E. I. du Pont de Nemours & Company**
Elvadex—Vinyl acetate copolymer. **E. I. du Pont de Nemours & Company**
Elvanol—Polyvinyl alcohol resin. **E. I. du Pont de Nemours & Company**
Emco—Ball mills, pebble mills, utilized agitator drives. **Epworth Manufacturing Co.**
Emcol—Emulsifiers. **Witco Chemical Co.**
Emerox—Dibasic acids. **Emery Industries, Inc.**
Emersol—Fatty acids made by selective solvent separation. **Emery Industries, Inc.**
Emery—Vegetable fatty acids. **Emery Industries, Inc.**
Emfac—Monobasic acids. **Emery Industries, Inc.**
Empol—Polymerized fatty acids. **Emery Industries, Inc.**
Emulphogene—Surface active agents. **General Aniline & Film Corp.**
Emulphor—Nonionic surfactant. **Antara Chemicals Div. of Gen'l Aniline & Film Corp.**

Emulsive—Driers, for paint, varnish, etc. **Witco Chemical Co., Inc.**
Enifac—Emery Industries, Inc.
Epi-Cure—Curing agents for Epoxy Resins—**Jones-Dabney Co.**
Epi-Rez—Pure epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epi-Tex—Oil modified epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epi-Var—Oil modified epichlorohydrin bisphenol resins. **Jones Dabney Company**
Epocast—Epoxy resins. **Furane Plastic, Inc.**
Epolene—Polyethylene waxes. **Eastman Chemical Prod., Inc.**
Epon—Epoxy resins. **Shell Chemical Corp.**
Epotuf—Epoxy resins. **Reichhold Chemicals, Inc.**
Erco-Reco Brown—Concentrated brown iron oxides. **Reichard-Coulston, Inc.**
Espesol—Aromatic, aliphatic and intermediate solvents. **Eastern States Chemical Corp.**
Essar—All Products, A. **Stresen-Reuter, Inc.**
Esskol—Refined linseed oil. **Spencer Kellogg & Sons, Inc.**
Esso—Aliphatic petroleum solvents. **Esso Standard Oil Company**
Ester Gum 8D and 8L—Glycerol esters of pale wood rosin. **Hercules Powder Company**
Estynox—Epoxidized fatty ester plasticizers. **Baker Castor Oil Co.**
Ethoduomeens — Amine-type surface active agents. **Armour Industrial Chemical Co.**
Ethofats—Surface active agents. **Armour Industrial Chemical Co.**
Ethomeens—Surface active agents. **Armour Industrial Chemical Co.**
Ethomids—Surface active agents. **Armour Industrial Chemical Co.**
Eukanol—Finishing agents. **General Aniline & Film Corp.**
Eulan—Finishing agents. **General Aniline & Film Corp.**
Eulava—Finishing agents. **General Aniline & Film Corp.**
Eulysine—Finishing agents. **General Aniline & Film Corp.**
Eunaphthol—Dispersing agent. **General Aniline & Film Corp.**
Eureka—Mill Jars, **Abbe Engineering Co.**
Euston White Lead—Basic carbonate of lead. **The Glidden Co.**
EVT. 50—Thyrene buladiene latex. **Cargill, Inc.**
EXBC—Polyvinyl Ethyl ether polymer. **Union Carbide Plastics Co.**
EXBM—Polyvinyl ethyl ether polymer. **Union Carbide Plastics Co.**
Excello White—Calcium carbonate. **Tamms Industries Co.**
Excelsior—Carbon Black pigment. **Columbian Carbon Company**
Excelsior—Industrial Rotary Pumps. **Foster Pump Works, Inc.**
Exkins—Volatile anti-oxidant. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Exon—Vinyl & Styrene Resins. **Firestone Plastics Company**
Extra Fine—Aluminum pastes and powders. **Silberline Mfg. Company, Inc.**

F

FA—ALKYDS. **Farnow, Inc.**
FA—Furfuryl alcohol. **The Quaker Oats Co.**
Fade-Ometer—Sunfastness Testing Machine. **Atlas Electric Devices Company**
FAFL—Flat Alkyd Vehicle. **Farnow, Inc.**
Falk Soybean Oils—Soybean oils, (raw, bodied, blown, kettled and specialty). **Cargill, Inc.**
Falkidine—Hard drying fish oils. **Cargill, Inc.**
Falkolin—Linseed oils, (raw bodies, blown, kettled and specialty). **Cargill, Inc.**
Falkomast—Fish and soybean oils specially processed for caulking compounds. **Cargill, Inc.**
Falklore—Esterified tall oils. **Cargill, Inc.**
Falkosoy—Maleinized soybean oils. **Cargill, Inc.**
Falkote—Maleic ester gums. **Cargill, Inc.**
Falkovar—Fish oils (raw, bodied, blown kettled and specialty). **Cargill, Inc.**
Falkowood—Maleinized linseed oils and fish oils. **Cargill, Inc.**
Falkyd—Oil modified alkyd resins. **Cargill, Inc.**
Fanchon Yellow—Hansa Yellows. **Harmon Colors**
Faqd—Medium Oil length alkyd. Farnow, Inc.
Farac—Tall oil fatty acid. **Farac Oil & Chem. Co.**
Faracol—Diethylene glycol—**Farac Oil & Chemical Co.**
Fastolux—Phthalocyanine green or blue toner. **Ansbacher-Siegle Corp.**
Fast Yellow—Yellow pigment. **R-B-H Dispersions.**
Fatchemco-O—Emulsifier. **Universal Chemicals Corporation**
Fax—Alkyd flat vehicle. **Farnow, Inc.**
FCD—Alkyd, phenolic, natural resins. **France, Campbell & Drying, Inc.**
FEGO—Enamel vehicle. **Farnow, Inc.**
Feon—Epoxy ester. **Farnow, Inc.**
Fer 3—Alkyd for emulsion and latex paints. **Farnow, Inc.**
Ferro—Plastic stabilizers and fungicides. **Ferro Chemical Div.**
Feutron—Synthetic fiber felts. **American Felt Co.**
Filmex—Solvent. **U. S. Industrial Chemicals Co.**
Fine—Organic dry color. **Sandoz, Inc., Fine Color Div.**
Firecrete—Refractory materials. **Johns-Manville Corp.**
Flavite—Limed Rosin. **Nello Resins, Inc.**
Firestone-Nylon 200 Series—Type 6 Nylon. **Firestone Plastics Co.**
Flexac—Emulsion polymer. **The Colton Chemical Co.**
Flexaqua—Water Emulsion Paint Vehicle. **Farac Oil & Chemical Co.**
Flexbond—Polyvinyl acetate emulsion. **The Colton Chemical Company**
Flexol—Plasticizers. **Union Carbide Chemicals Co.**
Flexowax C—Synthetic wax; anti-mar agent for lacquers. **Glyco Products Company, Inc.**
Flexricin—Castor oil—derived plasticizers. **Baker Castor Oil Co.**
Flextal—High rosin, non-crystallizing distilled tall oil. **Farac Oil & Chem. Co.**
Flextrol—Plasticizers. **McWhorter Chemicals, Inc.**
Flexwall—Phthalic alkyd flat wall tall oil vehicle. **Farac Oil & Chem. Co.**
FloInducer—Levelling agent. **Raybo Chemical Company**
Flomax—Stabilizer. **National Lead Co.**
Florence—French Process Zinc Oxide. **New Jersey Zinc Company**
Flow-Master—Homogenizer. **Marco Company, Inc.**
Foam Barytes—Refined barytes. **DeLore Div., National Lead Co.**
Foamex—Liquid defoaming agent. **Glyco Products Company, Inc.**
Foamtrol—Antifoam Agent. **Arlen Chemical Corp.**
Fo-Glo—Rosin gloss oil. **Newport Industries Co., Div. of Heyden-Newport Chem. Corp.**
F-O-M—Float-I-Matic control of rolls. **J. M. Lehmann Company, Inc.**
Fomout—Foaming prevention material. **R. T. Vanderbilt Co.**
Fomrez—Polyester resins. **Witco Chemical Co.**
Formcels—Formaldehyde solutions. **Celanese Corporation of America**
Formvar—Polyvinyl formal resin. **Shawinigan Resins Corporation.**
Fosbond—Phosphate coating and rust-proofing compound. **Pennsalt Chemicals Corp.**
Fosfo—Lined wood rosin. **Newport Industries.**
Foster—Rotary Pumps. **Foster Pump Works, Inc.**
Fotocol—Proprietary Solvent. **Commercial Solvents Corporation**
FR-28—Sodium Borate, fire retardant. **Pacific Coast Borax Company**
Franklin—Pulverizers. **Franklin P. Miller & Son, Inc.**
Freon—solvents, propellant. **E. I. du Pont de Nemours & Co. Inc.**
Fungitrol 11—nomercurial fungicide. **Nuodex Products Co.**
Furmex—semi-reinforcing furnace black. **Columbian Carbon Co.**
Futura—Ball and pebble mill. **Patterson Foundry & Machine Co.**

G

Gafite—Polymethyl alphachloroacrylate. **General Aniline & Film Corp.**
Gamaco—Calcium carbonate pigment. **The Georgia Marble Co.**
Gamakal—Calcium carbonate pigment. **The Georgia Marble Co.**
Gelva—Polyvinyl acetate resins. **Shawinigan Resins Corporation**
Gelvatol—Polyvinyl acetate emulsions. **Shawinigan Resins Corporation**
Gelzit—Gelling agent. **Baker Castor Oil Co.**
Genamid—Co-reactants for epoxy resin. **General Mills Chemical Div.**
Gen Epoxy—Epoxy resins. **General Mills Inc. Chemical Division.**
Gen-Flo—Styrene butadiene emulsion. **The General Tire & Rubber Company**
Gen-Foam—Prepolymer rigid, activator, foam—**General Tire & Rubber Co., Chemical Div.**
Genesol #2, #6—Terpene solvent. **Newport Industries Co. Div. of Heyden-Newport Chem. Corp.**
Genetron—Aerosol propellant. **General Chemical Div., Allied Chemical Corp.**
Gen-Tac—Vinyl pyridine latex. **General Tire & Rubber Co. Chemical Division.**
Genthane-S.—Polyurethane elastomer. **General Tire & Rubber Co., Chemical Division.**
Gentro-Jet. Black masterbatch. **General Tire & Rubber Co. Chemical Division.**
Gentrol—Unpigmented SBR. **General Tire & Rubber Co. Chemical Division.**
Geon Latex—Polyvinyl chloride emulsions. **B. F. Goodrich Chemical Company**
Gerlinger—Trucks and carriers. **Gerlinger Carrier Co.**
GGP Aluminum Extra Brilliant—Flake Aluminum Power. **U. S. Bronze Powder Works, Inc.**
Giant—Mixers. **The J. H. Day Co.**
Gilders Whiting—Calcium carbonate. **Tamms Industries Co.**
Glaurin—Grinding aid and dispersing agent. **Glyco Products Company, Inc.**
Globlak—Carbon black—nitrocellulose chip. **Columbian Carbon Co.**
Glomax—Calcined clays. **Georgia Kaolin Co.**
Glycosperse—Emulsifying agent. **Glyco Products Co.**
Glycerine—Solvents. **General Aniline & Film Corp.**
Glyptal—Alkyd resins. **Archer-Daniels-Midland Co.**
G.N.S. #5—Pine Oil. **Newport Industries**
Go Getter—Electric lift truck. **Revolvator Co.**
Gold Bond "A" Silica—Amorphous Silica. **Tamms Industries, Inc.**
Gold Drops—Gold dispersions for lacquers. **B. F. Goodrich Chemical Co.**
Good-Rite—Salts of polacrylic acid. **B. F. Goodrich Chemical Co.**
GPF—Containers. **Geuder-Paeschke & Frey Co.**
Granada—Phthalocyanine green. **Standard Ultramarine & Color Co.**
Granco—Positive Displacement Meter, Pumps Live and Suction Strainers. **Granberg Corp.**
Granodraw—Zinc-phosphate coating chemicals for cold-forming. **Amchem Products, Inc.**
Granodine—Zinc-phosphate coating chemicals for bonding paint to steel. **Amchem Products, Inc.**
Graphic Red—Lithol reds. **Sherwin-Williams Co.**
Graphtol—Organic pigments. **Sandoz, Inc.**
Green-Pond—Lightfast yellow pigment. **E. I. du Pont de Nemours & Co., Inc., Pigments Dept.**
Grellow—Special lead chromate for green. **Kentucky Color & Chemical Company**
Grip-Tight—Labeling Paste. **Morningstar-Paisley Products, Inc.**
Groco—Fatty acids. **A. Gross & Company**
GRP—Shellacs. **Gillespie-Rodgers-Pyatt Co., Inc.**
Guide-O-Matic—Control system for lift trucks. **Barrett-Cravens Co.**
Gulf—Aliphatic petroleum solvents. **Gulf Oil Corporation**
Guyandot Red Toners—Toluidine Substitutes. **Standard Ultramarine & Color Company**
Gyro-Centric—sifting screens. **The Patterson Foundry & Machine Co.**

H

Half-second Butyrate—Cellulose acetate butyrate resin. **Eastman Chemical Products, Inc.**
Hallco—Plasticizers. **The C. P. Hall Co. of Illinois.**
Halowax—Chlorinated naphthalene waxes. **Union Carbide Plastics Co.**
Hamatrol—Controller hammer vehicles. **McWhorter Chemicals, Inc.**
Handy-Pak—Steel pails. **Bennett Industries, Inc.**
Harflex—Plasticizers. **Harchem Division, Wallace & Tiernan**
Harshaw-V—Vinyl Stabilizers. **The Harshaw Chemical Company**
HB-20, 40—Alkyl-aryl type plasticizers. **Monsanto Chemical Company**
Heliogen—Phthalocyanine blue and green pigments. **General Dyestuff Corp.**
Helio yellows—bordeaux-vat yellows, azoic bordeaux. **Antara Chemicals, A Div. of General Aniline & Film Corp.**
Helix—Limed wood rosin. **Newport Industries**
Hercoflex—Chemical plasticizers. **Hercules Powder Company**
Hercolyn—Hydrogenated methyl ester of rosin. **Hercules Powder Company**
Hercules—Mixer. **The J. H. Day Co.**
Het—Anhydride—curing agent for epoxy resins' **Hooker Chemical Corp.**
Het Acid—chlorendic intermediate for fire retardant resins for paints etc. **Hooker Chemical Corp.**
Hetron—Polyester resins. **Hooker Electrochemical Company**
Hexogen—Paint driers. **Advance Solvents & Chemical Div., of Carlisle Chemical Works, Inc.**
Hi-Brite—Fluorescent products. **Shannon Luminous Materials Co.**
Hi-fax—Polyethylene coating. **Hercules Powder Co.**
Hifos—Limed wood rosin. **Newport Industries**
HiSolv Solvents—Petroleum Aromatic solvents. **Pennsylvania Industrial Chemical Corp.**
Hi-V12—Fluorescent paints. **Lawter Chemicals, Inc.**
HiWhite—Airfloated Georgia kaolinite. **J. M. Huber Corp.**
Horse Head—Zinc pigments. **New Jersey Zinc Company**
HR Cobalt 254—A cobalt "feeder" drier. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
HTS—Basic Carbonate White Lead. **National Lead Company**
Huber—Koolin (aluminum silicate) fillers, extender pigments. **J. M. Huber Corp.**
Hybase—Barium, calcium, magnesium sulfonate. **Bryton Chemical Co.**
Hycar—Rubber & latex. **B. F. Goodrich Chemical Co.**
Hycryl—Polyacrylate. **UBS Chemical Corp**

Hydrasperse—Aluminum silicate extender pigment. **J. M. Huber Corp.**
Hydratex—Aluminum silicate extender pigment. **J. M. Huber Corp.**
Hydrite—Hydrated aluminum silicates. **Georgia Kaolin Co.**
Hydrofol—Glycerides & Fatty acids. **Archer-Daniels-Midland Company**
Hydro-Lock—Conversion unit. **Blach Industries**
Hydro-Magna—A suspension of magnesium hydroxide. **Merck & Co., Inc.**
Hydros—Heat treated wood rosin. **Newport Industries Co.**
Hyfac—Hydrogenated fatty acid. **Emery Industries, Inc.**
Hylene—Isocyanates. **E. I. du Pont de Nemours & Co., Inc.**
Hyonic—Surface active agent. **Nopco Chemical Company**
Hypalon—Chlorosulfonated polyethylene elastomer. **E. I. du Pont de Nemours & Company, Elastomers Div.**
Hyprin—Plasticizer, chemical intermediate. **Dow Chemical Co.**
Hy-R-Speed—Mixer. **The J. H. Day Company.**
Hy-Speed—Agitators & Mixers. **Alsop Engineering Corporation**
Hyster—Lift trucks, straddle carriers, mobile yard cranes. **Hyster Co.**
Hytrol—cyclohexanol (solvent). **E. I. du Pont de Nemours & Co., Inc.**
Hywax—Fatty alcohol. **Werner G. Smith**

I

I Style—Oblong paint can with screw neck or Neuman opening. **American Can Co.**
IAF Compound—Anti-floating agent. **Imperial Paper & Color Corp.**
Iceberg—Calcined Kaolin extender. **Burgess Pigment Company**
Icecap K—Calcined Kaolin extender. **Burgess Pigment Co.**
Icepon—Surface active agent. **General Aniline & Film Corp.**
Igepal—Emulsifiers. **Antara Chemicals**
Igepon—Wetting & dispersing agents. **A ara Chemicals, Div. of General Aniline & Film Corp.**
Imperial Colors—Pigments. **Imperial Paper & Color Corp.**
Imperial—Mixer. **The J. H. Day Company.**
Imperse—Pigment dispersion. **Imperial Paper & Color Corp.**
Impervite—Centrifugal pumps. **Fallas Industries, Inc.**
Indanthrene—blues-greens-vat blues-greens. **Antara Chemicals, A div. of General Aniline & Film Corp.**
Indo Blue B-1—Indanthrene blues. **Harmon Colors**
Indo Marron MV-6601—Thio Indigoid maroon. **Harmon Colors**
Indopol—Liquid polybutenes. **Indoil Chemical Company**
Indulin 70-GR-S—Copreipitate of lignin and a butadiene-styrene copolymer. **West Virginia Pulp and Paper Company**
Indusoil—Distilled tall oil. **West Virginia Pulp & Paper Company**
Int. Fibre—medium consistency, for use in caulking compounds. **International Talc Co., Inc.**
Int. Fibre Special—High consistency-caulking compounds, mastic cements, oil & water texture paints. **International Talc Co., Inc.**
International—Mixers. **International Engineering, Inc.**
Iosol—Spirit soluble dyes. **National Aniline Division, Allied Chem. Corp.**
Iridite—Chromate conversion coatings. **Allied Research Products, Inc.**
Iron Red—Calcined synthetic yellow oxide. **Reichard-Coulston, Inc.**
Iron Yellow—Precipitated pure yellow oxide. **Reichard-Coulston, Inc.**
Irox—Iron oxides. **Reichard-Coulston, Inc.**
Irrathene—Irraduated polyethylene. **General Electric Co.**
Isco Amorphous Silica—Extender pigment. Silica. **Innis, Speiden & Company, Inc.**
Isofoam—Polyisocyanate foaming resin. **Isocyanate Products, Inc.**
Isoline—Dehydrated castor-oil. **Woburn Chemical Co.**
Isonel—Insulating Vsh. **Schenectady Varnish Co., Inc.**
Isolite—Polyester Resin. **Schenectady Varnish Co., Inc.**
Isotrol—Alkyd oils. **McWhorter Chemicals, Inc.**
Isotrol C & A—Copper & Quindinoleute. **Ferro Chemical Corp.**
Isotron—Propellants and refrigerants. **Pennsalt Chemical Corp.**
Ivo—Bone blacks. **Columbian Carbon Co.**

J

JacBoy—Drum liner. **Jones & Laughlin Steel Sales Corp.**
Jaliner—Polyethylene liner. **Jones & Laughlin Steel Sales Corp.**
Jaysol—Isopropyl alcohol. **Enjay Company, Inc.**
Jel-I-Mer—Thixotropic additive. **Alkydol Labs, Div. of Reichhold Chemicals, Inc.**
Jet—Mixers. **Herman Hockmeyer Machinery Co., Inc.**
Jet Mill—High speed dispersion mill for liquids. **Patterson Foundry & Machine Company**
Jet Milled—Finely divided pigments. **Mineral Pigment Corp.**
Jet-Pak—Self-powered sprayer. **Sprayon Products, Inc.**
Jumbo—Mixer. **The J. H. Day Company.**

K

KP—Anti-foam agent. **Chemical & Plastics Division Food Machinery & Chemical Co.**
Kadox—Finest particle size Zinc Oxides. **New Jersey Zinc Co.**
Kady Mills—Dispersion Milling Equipment. **Kinetic Dispersion Corporation**
Kalmac—Extender pigment. **Georgia Marble Co.**
Kaolinites — Hydrated aluminum silicates. **Georgia-Kaolin Co.**
Kapsol—Plasticizer. **Chemical & Plastic Division Food Machinery & Chemical Corp.**
Kapsol—Plasticizer. **Ohio-Apex Division**
Karry-Krane—Mobile yard crane. **Hyster Co.**
Katanol—Mordants. **General Aniline & Film Corp.**
Katapone—Rust Inhibitor. **General Aniline & Film Corp.**
Kaymol—Surface active agent emulsifier, anti-foaming agent. **Kraft Chemical Company**
KCC—Talc type extender. **Kraft Chemical Co.**
Kelcosol—Fibrous refined, high viscosity sodium alginate. **Kelco Co.**
Kelecin—Surface active agent. **Spencer Kellogg & Sons, Inc.**
Kellin—Refined linseed oil. **Spencer Kellogg & Sons, Inc.**
Kel-sol—Universal tinting vehicle. **Spencer Kellogg & Sons, Inc.**
Keltex—Granular high viscosity sodium alginate. **Kelco Co.**
Keltrol—Styrenated linseed and soybean oils, vinyltoluene copolymer. **Spencer Kellogg & Sons, Inc.**
Kel-Vi-Tol—Linseed varnish oil. **Spencer Kellogg & Sons, Inc.**
Kel-X-L-Treated linseed oil. **Spencer Kellogg & Sons, Inc.**
Kenflex A—Polymer of aromatic hydrocarbons. **Kenrich Corp.**
Kenite—Extender pigment: diatomaceous earth. **Innis, Speiden & Co., Inc.**
Kiwi—Code dating and marking machines. **Kiwi Coders Corp.**
Kneadermaster—Dispersion type mixer. **Patterson Foundry & Machine Company**
Kodox—Colloidal zinc oxides. **New Jersey Zinc Co.**
Koflex—Plasticizers and defoamers. **Kolker Chemical Corp.**
Kollamine—Dye assistants. **General Aniline & Film Corp.**
Kopol—Congo copal resins. **Reichhold Chemicals, Inc.**
Koresin—Condensation product of p-tertiary butyl phenol with acetylene. **General Dyestuff Corp.**
Korp—Soda-treated wood rosin. **Newport Industries, Inc.**
Kosmolak—Carbon black. **United Carbon Co., Inc.**
Kosmos F-4, BB, 1—Carbon black. **United Carbon Co., Inc.**
KP—Plasticizer. **Ohio-Apex Div.**
KPO—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**
Kralastic—Styrene-butadiene resins. **Naugatuck Chemical**
Kreelon—Emulsifying wetting and penetrating agent (Anionic). **Wyandotte Chemicals Corp.**
Kromall—Pigment dispersions. **Kromall Chemical & Dispersions Corp.**
Kroma Reds—Pure precipitated red iron oxides. **C. K. Williams & Co.**
Kromosperse — Pigment dispersant. **Nuodex Products Co.**
Kronisol—Chemical plasticizers. **Ohio-Apex Div.**
Kronitex—Chemical plasticizers. **Ohio-Apex Div.**
Kronitex AA—Plasticizer. **Chemical & Plastics Div. Food Machinery & Chemical Corp.**
Krumbhaar—Phenolic resins. **Lawter Chemicals, Inc.**
KTPL—Low molecular weight polystyrene resins. **Koppers Company, Inc.**
K.V.O.—Linseed varnish oils. **Spencer Kellogg & Sons, Inc.**
Kyraza—Synthetic wax. **Air Reduction Chemical Co.**

L

L China Clay—China clay. **Tamms Industries Co.**
Lactol Spirits—An aliphatic naphtha in the toluo evaporation range. **American Mineral Spirits Company**
Laminac—Unsaturated polyester resins. **American Cyanamid Company Plastics & Resins Div.**
Landora—Soda-treated wood rosin. **Newport Industries Div. of Heyden-Newport Chem. Corp.**
Latok—Resin solution. **T. F. Washburn Co.**
"L" China Clay—China clay. **Tamms Industries, Inc.**
Lehigh—Leaded zinc oxide. **New Jersey Zinc Company**
Lemac—Polyvinyl acetate. **The Borden Co.**
Lemol—Polyvinyl alcohol. **The Bordon Co.**
Lewisol—Maleic alkyd-modified rosin esters. **Hercules Powder Company**
Lightnin—Mixers. **Mixing Equipment Co. Inc.**
Lignocol—Anti-skinning agent and anti-oxidant. **Heyden Chemical Corporation**
Ligrene—Crude tall oil substitute. **West Virginia Pulp & Paper Co.**
Ligro—Crude tall oil **West Virginia Pulp & Paper Company**
Lime-KYD—Alkyd vehicle. **California Ink Co., Inc.**
Lindol—Low color tricresyl phosphate. **Celanese Corporation of America**
Linoresinate—Tall oil type driers. **The Harshaw Chemical Company**
Linseed Pavamer—Maleic modified. **Pacific Vegetable Oil Corp.**
Linstyrol—Styrenated linseed oil. **Spencer Kellog & Sons, Inc.**
Liquiflow—Low pressure bulk CO-. **Liquid Carbonic Corp.**
Lithoform—Zinc phosphate coating chemicals for bonding paint to zinc. **Amchem Products, Inc.**
Lithol Rubine Toners—Lithol rubines. **Harmon Colors**
Lobeite—Limed rosin. **Nello Resins, Inc.**
Lo-Micron—Barytes. **Whittaker, Clark & Daniels, Inc.**
Lo-Odor—Octasol driers. **The Harshaw Chemical Company**
Lorite—Diatomaceous material. **DeLore Div., National Lead Company**
Lorol—Fatty alcohols-antifoams. **E. I. du Pont de Nemours & Co., Inc.**
LP-2—Polysulfide hydrocarbon resins. **Thiokol Corporation**
LPR-1—Latex additive. **Naftone, Inc.**
LS Raw Sienna—Italian raw Sienna. **Reichard-Coulson, Inc.**
Lucite—Methyl methacrylate resin. **E. I. du Pont de Nemours & Company, Polychemicals Dept.**
Lumard—Grinding jars. **Paul O. Abbe, Inc.**
Lumarol—Mill jar. **Patterson Foundry & Machine Co.**
Lumigraphic colors. Special organic colors fluorescing in daylight or under ultraviolet light. **Imperial Paper and Color Corporation**
Luncor PVC—Polyvinyl chloride valves. **Lunkenheimer Company**
Lustrasol—Acrylic solutions. **Reichhold Chemicals, Inc.**
Lustrelith—Lithopone. **Chemical Pigment Co.**
Lustrex—Polystyrene resins. **Monsanto Chemical Company**
Lustrex Latex—Polystyrene emulsion. **Monsanto Chemical Company Plastics Div.**
LX-685—Hydrocarbon resin. **Neville Chemical Co.**
Lytron—Interpolymer and styrene latices and resins for surface coatings and latex paints. **Monsanto Chemical Co., Plastics Div.**

M

M-50—Lead chromate pigment. **National Lead Co.**
MA-28-18—Vinyl alcohol-acetate resins. **Union Carbide Plastics Co.**
Macopol—Solvent soluble polymers. **McWhorter Chemicals, Inc.**
Magcarb-L—Magnesium carbonate. **Merck Marine Magnesium Div.**
Maglited—Reactive magnesium oxide. **Merck Marine Magnesium Division**
Magnaflake—Metal Powders and Pastes. **Magna Manufacturing Company, Inc.**
Magnamix—Dispersing agent. **Raybo Chemical Co.**
Majestic Yellow—Permanent benzidine yellow. **Imperial Paper & Color Corp.**
Makanol—Unsaturated fatty alcohols. **The Stepan Chemical Company**
Malix 138—Limed wood rosin. **Newport Industries, Inc.**
Mammopol—Modified fish oil. **Pacific Vegetable Oil Corp.**
Mapico—Iron oxide pigments. **Columbian Carbon Company**
Marbon 8000—High-styrene resins. **Marbon Chemical**
Marbon 9200—Styrene copolymer, resin and pigment chips. **Marbon Chemical**
Marco—Unsaturated polyester resin. **Celanese Corp. of America**
Marcothex—Unsaturated polyester. **Celanese Corp. of America**
MarHard—Mar proofing agent. **Raybo Chemical Company**

Ma...co CL—Extender. **Merck Marine Mag...ium Division**
Ma...icate—Additive. **Merck Marine Magne...n Division**
Ma...—Stabilizer. **Argus Chemical Corp.**
Ma...g—Polyethylene. **Phillips Petroleum Co.**
Ma...n Maroon—Yellowish BON maroon. **Standard Ultramarine & Color Company**
Marbalix—Styrene-butadiene latices. **Marbon Chemical**
Marec 6—Limed wood rosin. **Newport Industries Div. of Heyden-Newport Chem. Corp.**
Maroon-gold—Transparent durable maroon pigment. **E. I. du Pont de Nemours & Co., Inc.**
Marvinol—Polyvinyl chloride resin. **Naugatuck Chemical Div. of U. S. Rubber Co.**
Mashit f2—Paint deodorant. **Aromatic Products, Incorporated**
Max Var—Varnishes. **McWhorter Chemicals, Inc.**
MC—Catalyst for unsaturated polyester resins. **Celanese Corporation of America**
MD—Aluminum powders & pastes. **Metal Disintegrating Company, Inc.**
M.D.A.—Methylene disalicylic acid. **Heyden Chemical Corporation Div. of Heyden Newport Chem. Corp.**
Melaqua—Water soluble resins. **American Cyanamid Co.**
Meadol—Lignin. **The Mead Corporation**
Mearlite—Non-lead synthetic pearl pigment. **The Mearl Corp.**
Mearlmaid—Natural pearl essence. **The Mearl Corp.**
Melmac—Melamine-Formaldehyde resins. **American Cyanamid Company Plastics and Resins Div.**
Melurac—Bonding resin. **American Cyanamid Co.**
Mercadium—Cadmium mercury. **Imperial Color Chemical & Paper Corp.**
Mercadmolith Reds—Cadmium-Mercury colors. **The Glidden Co.**
Merlon—Polycarbonate resins. **Mobay Chemical Co.**
Merez—Zinc resinates. **Nelio Resins Inc.**
Merol—Zinc resinate solution. **Nelio Resins Inc.**
Merpol—Surface active agent. **E. I. du Pont de Nemours & Co., Inc.**
Mersolite—Fungicides phenyl mercury salts. **Innis, Speiden & Co., Inc.**
Mert ZT—Fungicide. **Carolina Aniline & Extract Company**
Metalead—Metallic lead flakes. **Metalead Products Corporation**
Metasap—stearates, palmitates, etc. **Metasap Div. Nopco Chemical Co.**
Metasap—Suspending agent. **Div. of Nopco Chemical Co., Metsap Chem. Co.**
Metasol—Bacteriacides fungicides. **Metalsalts Corp.**
Methac—Methyl acetate-methanol. **The Borden Company**
Methocel-Methyl cellulose. **The Dow Chemical Company**
Methox—Plasticizer. **Chemical & Plastics Div. Food Machinery & Chemical Corp.**
Methyl acetone—Methyl acetate-methanol-acetone. **The Borden Company**
Methylac—Methyl acetate solvent. **The Colton Chemical Company**
Methylon—Chemical resistant coating intermediates. **General Electric Co.**
Meto—Methyl ester of tung oil. **Pacific Vegetable Oil Corp.**
Metso 99—Surface active agents. **Philadelphia &uartz Company**
Mi-Cal—Calcium carbonate. **DeLore Div., National Lead Co.**
Micro-Cel—Synthetic calcium silicates. **Johns-Manville**
Micro-Klean—Micronic disposable filter cartridge. **The Cuno Engineering Corp.**
Micro-Micra—Finely ground micronized mica. **The English Mica Company**
Micromite—Calcium carbonate. **Tamms Industries Co.**
Micronex—Channel black. **Columbian Carbon Co.**
Micro Stardust—Magnesium silicate. **Tamms Industries, Inc.**
Micro Velva—Calcium carbonated extender pigment. **Carbola Chemical Company**
Midas Gold—Gold pigment. **R-B-H Dispersions**
Mijit—Grinding jar. **Paul O. Abbe, Inc.**
Mikro—Milling machinery. **Pulverizing Machinery Company**
Mill—Limed wood rosin. **Newport Industries, Inc.**
Miller—Crushers. **Franklin P. Miller & Sons, Inc.**
Milmer—Fungicides. **Monsanto Chemical Co.**
Mil-Reactor—Multiple processing unit. **The Patterson Foundry & Machine Co.**
Mil-Reactor—Multiple processing unit. **The Patterson Foundry & Machine Co.**
Ming Orange—Molybdate orange. **Kentucky Color & Chemical Company**
Mintrol Spirits—A new mineral spirits with a very mild odor. **American Mineral Spirits Co.**
Mirares—Rosin. **Crosby Chemicals, Inc.**
Mirasol—Alkyd resins. **C. J. Osborn Company**
Mixall Mixers—Claw mixing propellers. **Craddock Equipment Company, Inc.**
Mix Mor—Mixers. **J. H. Day Co.**
Macatawa Red Tone—Lithol ruliene pigment **Holland Color & Chemical Co.**
Mobilwax—Waxes. **Mobil Oil Co.**
Mobilcer—Wax emulsions. **Mobile Oil Co.**
Mobilpar—Anti-foaming agents. **Mobil Oil Co.**
Mobilsol—Solvents & plasticizers. **Mobile Oil Co.**
Mod-Epox—Epoxy-resin modifier. **Monsanto Chemical Co.**
Modicol—Synthetic thickener for latex paints. **Nopco Chemical Company**
Mogul—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Mogul—Mixer. **The J. H. Day Company.**
Molacco—Carbon black pigment. **Columbian Carbon Company**
Molora Maroon—Light BON maroon. **Standard Ultramarine & Color Company**
Monamine—Surface active agents. **Mona Industries, Inc.**
Monaquest—Chelating agents. **Mono Industries, Inc.**
Monastral—Pigments. **E. I. du Pont de Nemours & Co., Inc.**
Monarch—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Monarch—Copper phthalocyanine blue and green. **Imperial Paper & Color Corp.**
Monawets—Wetting agents. **Mona Industries, Inc.**
Monochrome Greens—Pigments; co-precipitated phthalocyanine boue and chrome yellow. **Imperial Paper and Color Corporation**
Monastral—Copper phthalocyanine blue and green. **E. I. du Pont de Nemours & Company Pigments Div.**
Monastral Red—Red organic pigment. **E. I. du Pont de Nemours, Pigment Div.**
Mondur—Isocyanate. **Mobay Chemical Co.**
Monopentek — Monopentaerythritol. **Heyden Chemical Corporation**
Monoplex—Monomeric ester plasticizers. **Rohm & Haas Company**
Monosulph—Emulsifier for water-based paints. **Nopco Chemical Co., Metasap Chem. Co.**
Montar—Low cost binders, resin extenders, flame retardants, secondary plasticizers. **Monsanto Chemical Co.**
Montclair Red—Naphthol red toner. **Ansbacher-Siegle Corp.**
Morehouse—Grinding mills. **Morehouse-Cowles, Inc.**
Morlex—Corrosion inhibitor. **Union Carbide Chemicals Co.**
Morningstar—Starches and Dextrines. **Morningstar, Nicol, Inc.**
M-P-A—Heat-stable specialty paint additive. **Baker Castor Oil Co.**
MPL Monomer — Autopolymerizable acrylic monomer. **The Borden Company, Polco Monomer Dept.**
MR—Unsaturated polyester resins. **Celanese Corporation of America**
MS2—Alicyclic ketone resin. **Howards & Sons, Ltd.**
Multicel—Diatomaceous earth. **Tamms Industries, Inc.**
Multiflex—Calcium carbonate extender pigments. **Diamond Alkali Company**
Multifex MM—Ultra-fine precipitated calcium carbonate—**Diamond Alkali Company.**
Multisperse—Stir in pulps for latex paint. **Pigment, Color & Chemical Div. Sherwin-Williams Co.**
Multrathane — Elastomer chemical. **Mobay Chemical Co.**
Multron—Polyester. **Mobay Chemical Co.**
Munn—Soda-treated wood rosin. **Newport Industries, Co., Div. of Heyden-Newport Chem. Corp.**
Murano Colors—Synthetic pearl. **The Mearl Corp.**
Myverol—High potency distilled monesters. **Distillation Products Industries**

N

Naccolene Concentrate—Detergent. **National Aniline Division, Allied Chemical Corp.**
Nacconate—Diisocyanates. **National Aniline Division, Allied Chemical Corp.**
Nacconols—Detergents. **National Aniline Div. Allied Chemical Corp.**
Naccosol—Wetting agents. **National Aniline Division, Allied Chem. Corp.**
Naccotan—Dispersing agent. **National Aniline Division, Allied Chemical Corp.**
Nacromer—Pearl essence. **The Mearl Corp.**
Nadic—Dicarboxylic acid. **National Aniline Division, Allied Chemical Corp.**
Nadone—Cyclohexanone. **Allied Chemical Co., Nation Aniline Division.**
Nalzin—Stabilizer. **National Lead Co.**
Naphthanil—Pigments. **E. I. duPont de Nemours Co., Inc.**
National—General brand mark. **National Aniline Division Products. Allied Chem. Corp.**
Natural-Shape Media—High density grinding media. **LZP Industrial Ceramics**
Naugatex—Copolymer latex. **Naugatuck Chemical Div., U. S. Rubber Co.**
Naxol—Cyclohexanol—**Allied Chemical Corp. Allied Chemical Corp.—National Aniline Div.**
Nebony—Hydrocarbon resin (thermo-plastic). **Neville Chemical Co.**
Nekal—Wetting agent. **General Aniline & Film Corp.**
Nello—Gum rosin & gum turpentine. **Nello Resins Inc.**
Neo-fats—Fatty acids. **Armour Industrial Chemical Co.**
Neolyn—Rosin derived alkyd resin. **Hercules Powder Company**
Neopone—Emulsifier. **Witco Chemical Co.**
Neo Spectra—Carbon black pigment. **Columbian Carbon Company**
Neosol—Ethyl alcohol proprietary solvent. **Shell Chemical Corporation**
Neotex—Furnace Black. **Columbian Carbon Co.**
Nesaco—Potato starch. **Morningstar, Nicol, Inc.**
Nettco—Agitating equipment. **New England Tank & Tower Company**
Nevastain—Non-staining anti-oxidents. **Neville Chemical Co.**
Nevillac—Phenol-modified coumarone and alkylated phenols. **Neville Chemical Company**
Nevillite—Light colored hydrocarbon rosin. **Neville Chemical Co.**
Nevidene—Coumarone-indene resins. **Neville Chemical Company**
Nevinol—Plasticizing and solvent oils. **Neville Chemical Company**
Nevsolv—Aromatic petroleum solvents. **Neville Chemical Company**
Newport Maroon—Transparent double maroon pigment. **E. I. du Pont de Nemours & Co., Inc., Pigments Dept.**
Newtrex—Special wood rosin. **Newport Industries, Inc., Div. of Heyden-Newport Chem. Corp.**
Niagathal — Tetrachlorophthalia anhydride. **Hooker Chemical Corp.**
Nialk — Trichlorethylene. **Hooker Chemical Corp.**
Niax—Polyether foam intermediates. **Union Carbide Chemical Co.**
Nildew—Fungicides. **Naftone, Inc.**
Nilskin—Anti-skinning agent. **Naftone, Inc.**
Nitrocal—Lacquer pigment dispersions. **C. J. Osborn Co.**
Nitro Fast—Hydrocarbon soluble dyes. **Sandoz, Inc.**
Non-Fer-Al—High purity precipitated calcium carbonate. **Diamond Alkali Co.**
Non - Flocculating Green — Phthalocyanine greens. **Harmon Colors**
Nonic—Surface active agents. **Industrial Div., Pennsalt**
Nonisols—Surface active agent. **Geigy Industrial Chemicals**
Nopco—Anti-foam agents. freeze-thaw stabilizers, wetting agents. **Nopco Chemical Company**
Nopcocastor — Sulfated Castor Oil. **Nopco Chemical Co.**
Nopco 1572-R—Polyvinyl acetate emulsion. **Nopco Chemical Company**
Nopcote—Polyamide resins. **Nopco Chemical Company**
Nopcosant—Dispersing agent. **Nopco Chemical Company**
Nopco wax 22-DS—Synthetic wax. **Nopco Chemical Company**
Nopcowet A—Pigment grinding aid. **Nopco Chemical Co.**
Nora—Soda-treated wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**
Norlin—Catalytically polymerized linseed and soybean oils. **Cargill, Inc.**
Normasol—Stabilizers for vinyls. **National Lead Company**
Norvan—Polyvinyl acetate emulsions. **R. T. Vanderbilt Company**
Nox-Rust—Corrosion inhibitor. **Danbert Chemical Co.**
NPA—Semi-alkyd vehicles. **Farnow, Inc.**
Nuact Paste—Lead "feeder" drier. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Naude—Grinding aid. **Nuodex Products Co., Div. of Heyden-Newport Chem. Corp.**
Nuba—Coumarone-indene resins. **Neville Chemical Company**
Nulix-15—Limed polymerized wood rosin. **Newport Industries, Inc.**
Nullapon—Sequestering agents. **Antara Chemicals Div. of Gen'l Aniline & Film Corp.**
Nulskin—Discontinued name for anti-skinning agent. **Raybo Chemical Company**
Nuodex—Fungicides and driers. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Nuogel A. O.—Thickening agent. **Nuodex Products Company, Inc. Div. of Heyden-Newport Chem. Corp.**
Nuolates—Tallate driers. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Nuomix—Surface active agent. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuosept—Non-toxic paint preservative. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Nuosperse 657—A combination of surface active agents. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Nuroz—Polymerized wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**
Nutrex—Special wood rosin. **Newport Industries**
Nuvis—Bodying agents. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Nylocet—fire-proofing agent. **Scher Bros.**
Nylox U—Disproportinated wood rosin. **Newport Industries**
Nytal—Talc. **R. T. Vanderbilt Company**

O

Octasol—Driers. **The Harshaw Chemical Co.**
Ohopex—Plasticizer. **Chemical & Plastics Division—Ford Machinery & Chemical Corp.**
Oitoil—Oiticica oil. **Brazil Oiticica, Inc.**
OKO—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**
Omamid—Polyamide resin. **Olin Mathieson Chemical Corp.**
ONB—Ortho-nitrobiphenyl plasticizer. **Monsanto Chemical Company**
Oncor—Pigments. **National Lead Company.**
One Point—High speed mills. **Troy Engine & Machine Co.**
Oolitic—Dry milled calcium carbonates. **DeLore Div., National Lead Co.**
OO Silica Smoke—Amorphous Silica. **Tamms Industries, Inc.**
Opalon—Vinyl chloride resin. **Monsanto Chemical Company, Plastics Div.**
Opal wax—Hydrogenated castor oil. **Baker Castor Oil Co.**
Orlon Red—Yellowish red pigment. **Sherwin-Williams Co.**
Oronite—Polybutene. **Oronite Chemical Co.**
Orthophen—Amyl phenols for antiskinning. **Industrial Div., Pennsalt**
Orthotone Orange—Ortho-Nitraniline orange. **Standard Ultramarine & Color Company**
Ozark—Zinc oxide. **Sherwin-Williams Co.**
Ozlo—Leaded zinc. **Sherwin-Williams Co.**

P

PUC—Dispersion mill. **Pfaudler Co.**
Paco Solvent TR-590—Proprietary alcohol solvent. **Publicker Industries, Inc.**
Paideos—Paint deodorants. **Dodge & Olcott, Inc.**
Paint Base Oil—Special pigmented base oil. **Pacific Vegetable Oil Corp.**
Paint odors—Paint deodorants. **Sindar Corporation.**
Paisflex—Polyvinyl acetate resin paint base (internally plasticized). **Morningstar-Paisley, Inc.**
Paisley—General line of liquid labeling glues. **Morningstar-Paisley, Inc.**
Palatine—Dye assistants. **General Aniline & Film Corp.**
Palconate—Surface active agent. **The Pacific Lumber Company**
Palcotan—Surface active agent. **The Pacific Lumber Company**
Palletier—Lift trucks. **Barrett-Cravens Co.**
Pamak—Tall oil fatty acids. **Hercules Powder Co.**
Panaflex BN—Hydrocarbon plasticizer. **Amoco Chemicals Corp.**
Panapol—Synthetic hydrocarbon drying oils. **Amoco Chemicals Corp.**
Panarex—Petroleum hydrocarbon resins. **Amoco Chemicals Corp.**
Paradene—Coumarone-indene resins. **Neville Chemical Company**
Paragon—Kaolin. **J. M. Huber Corp.**
Paraplex—Plasticizers and polyester resins. **Rohm & Haas Company**
Parapol-S—High molecular weight copolymer of styrene and isobutylene. **Enjay Company, Inc.**
Parasepts—Anti-fungal and anti-bacterial agents. **Heyden-Newport Chemical Corporation**
Paricin—Saturated fatty ester plasticizers. **Baker Castor Oil Co.**
Parlon—Chlorinated natural rubber. **Hercules Powder Company**
Pastall—Driers. **The Harshaw Chemical Co.**
Pavoco Oil—Bodied linseed oil. **Pacific Vegetable Oil Corp.**
Pavoflex—Double processed fish oil. **Pacific Vegetable Oil Corp.**
Pavoil—Bodied oil. **Pacific Vegetable Oil Corp.**
Pavolene—Refined linseed oil. **Pacific Vegetable Oil Corp.**
Pavolin Oil—Bodied linseed oil. **Pacific Vegetable Oil Corp.**
Pavasoy—Codied soybean oil. **Pacific Vegetable Oil Corp.**
Pavosynth—Modified linseed oil. **Pacific Vegetable Oil Corp.**
Paxinosa—Ground limestone. **C. K. Williams & Co.**
Paxwax—Microcrystalline waxes. **National Wax Company**
PC-1244—Defoaming Agent. **Monsanto Chemical Co.**
PCP Castor Oil—Raw expeller oil, unbleached. **Pacific Vegetable Oil Corp.**
PE—Polyhydric alcohol. **Hercules Powder Co.**
Peerless—Kaolin clay. **R. T. Vanderbilt Co.**
PEFA—Esterified distilled tall oils. **Crosby Chemicals, Inc.**
Penbro—"B" wood resin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**
Penbro 83—Linseed wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**
Penglo—Tall oil penta ester solution. **Newport Industries**
Pennco—Pigment dispersions & Chips. **Pennsylvania Color & Chemical Company**
Pennsalt—Metal cleaners, alkaline paint strippers, and paint spray booth water conditioners. **Pennsalt Chemicals Corp.**
Penros—Polymerized wood rosin. **Newport Industries**
Pent Acetate—Synthetic amyl acetate. **Industrial Div., Pennsalt Chemicals Corp.**
Pentacite—Pentaerythritol resins. **Reichhold Chemicals, Inc.**
Pentalyn—Pentaerythritol esters of rosin and phenolic-modified pentaerythritol esters of rosin. **Hercules Powder Company**
Pentasol—Synthetic amyl alcohols. **Industrial Div., Pennsalt**
Pentecat L—Alcoyolysis catalyst. **Advance Solvents & Chemical Division of Carlisle Chemical Works, Inc.**
Pentek—Pentaerythritol technical. **Heyden-Newport Chemical Corporation**
Pent-Oxol—High boiling glycol-ether solvent. **Shell Chemical Co.**
Pent-Oxone—High boiling keto-ether solvent. **Shell Chemical Co.**
Perclene—Perchlorethylene. **E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept.**
Peregal—Dye stripping agent. **General Aniline & Film Corp.**
Pergut—Chlorinated rubber. **Naftone Inc.**
Perma-leaf—Aluminum paste. **Reynolds Metals Co.**
Permachlor Red—Red dry colors. **Sherwin Williams Co.**
Permachrom Red—Red pigments. **Sherwin Williams Co.**
Permadine—Zinc phosphate coating chemicals for rust-proofing. **Amchem Products Corp.**
Permagel—Processed Fullers Earth thickener. **Minerals & Chemicals Philipp**
Permaline Blue—Phthalo Lake. **Whittaker, Clark & Daniels, Inc.**
Permanent—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**
Permansa—Nitroso naphthol green, chlor-para nitraniline red, and hansa yellow. **Sherwin-Williams Co.**
Permolith—Lithopone. **Sherwin-Williams Co.**
Permox—Lead chromate pigment. **Eagle Picher Co.**
Permyl—Stabilizer. **Ferro Chemical Division.**
Petrex—Unmodified Petrex alkyd resins. **Hercules Powder Co.**
Petrodor—Paint solvent deodorants. **Dodge & Olcott, Inc.**
Petrohol—Isopropyl alcohol. **Enjay Company, Inc.**
Petrolene—Aliphatic petroleum thinner. **Anderson-Prichard Oil Corporation**
Petrolite—Emulsifiable waxes. **Petrolite Corporation, Ltd.**
Petrometer—Liquid level indicators. **Petrometer Corp.**
Petronauba—Emulsifiable petroleum wax. **Bareco Oil Company**
Petropon—Heavy petroleum polymers. **American Mineral Spirits Company**
Petro-Resins—Polymerized olefinic hydrocarbons. **Petroleums Specialties Company**
Petrosul—Petroleum sulfonate. **Pennsylvania Refining Company**
Petrothene—Polyethylene resins. **U. S. Industrial Chemicals Co.**
Phelate—Crosslinking reagent. **J. S. Ayers Co.**
Phillips 66—Hydrocarbon solvents. **Phillips Petroleum Company**
Picco—Solvents & Solvent oils. **Pennsylvania Industrial Chemical Corporation**
Piccoflex—Hydrocarbon copolymer resin. **Pennsylvania Industrial Chemical Corp.**
Piccolastic—Low molecular wt. polystyrene resins **Pennsylvania Industrial Chemical Corp.**
Piccolyte—Polyterpene resins. **Pennsylvania Industrial Chemical Corporation**
Piccopale—Petroleum hydrocarbon resin. **Pennsylvania Industrial Chemical Corporation**
Piccopale Emulsion—Petroleum hydrocarbon resin emulsion. **Pennsylvania Industrial Chemical Corporation**
Piccoumaron—Coumarone-Indene resins. **Pennsylvania Industrial Chemical Corporation**
Piper Red—Pyrazalone red. **Ansbacher-Siegle Corp.**
P-K—Twin shell blender. **The Patterson-Kelly Company, Inc.**
Placco-Tex—Latex emulsion. **Borden Chemica Co.**
Planisol—Surface active agent. **The Girdler Company**
Plaskon—Alkyd molding compounds. **Plastics Coal Chemicals, Div. of Allied Chemical Corp.**
Plasticone—Pyrazolone red pigment. **Sherwin-Williams Co.**
Plasto—Dyes for plastics. **National Aniline Div. of Allied Chem. Corp.**
Plastoflex—Plasticizers. **Advance Solvents & Chemical Div., of Carlisle Chemical Works Inc.**
Plastograph—Processability recorder. **C. W. Brabender Instruments**
Plastolein—Chemical & resinous plasticizers. **Emery Industries, Inc.**
Pliioflex SBR-polymers—**Goodyear Tire & Rubber Co. Chemical Division.**
Pliolite latex—Styrene-butadiene emulsions. **The Goodyear Tire & Rubber Co. Inc.**
Pliolite, natural rubber—Cyclized natural rubber. **The Goodyear Tire & Rubber Co., Inc.**
Pliolite S-5—Styrene-butadiene resins. **The Goodyear Tire & Rubber Co., Inc.**
Pliovic—Polyvinyl chloride resins. **The Goodyear Tire & Rubber Co., Inc.**
Plumb-O-Sil—Stabilizers for vinyls. **National Lead Company**
Pluracol — Polyethyelene gycols. **Wyandotte Chemicals Co.**
Pluronics—Emulsifying agent (nonionic). **Wyandotte Chemicals Corp.**
Plymouth—Stearates. **M. W. Parsons-Plymouth Inc.**
Plyophen—Phenolic resins. **Reichhold Chemicals, Inc.**
PMAC—High boiling solvent-polymethoxy acetal. **General Aniline & Film Corporation**
PMN-10—Fungicide. **Nuodex Products Co., Div. of Heyden-Newport Chem. Corp.**
PMO-10—Fungicide. **Nuodex Products Co., Div. of Heyden-Newport Chem. Corp.**
POE—Modified polyester enamel vehicle. **Farnow, Inc.**
Polaris Red—Red pigments. **Sherwin-Williams Co.**
Polectron—Electron chemicals. **General Aniline & Film Corp.**
Polycin—Gelled castor oil. **Baker Castor Oil Co.**
Polyco—Resin emulsions. **The Borden Company**
Polyfon—Surface active agents. **West Virginia Pulp and Paper Company**
Poly G's—Polyethelyene glycols. **Olin Mathieson Chemical Corp.**
Polylite—Polyester Resins. **Reichhold Chemicals, Inc.**
Polymekon—Specially processed petroleum wax. **Warwick Wax Company, Inc., Div. of Sun Chemical Corp.**
Polymer C-3—Modified vinyl acetate resin. **Monsanto Chemical Co.**
Polyox—Water soluble resin. **Union Carbide Chemicals Co.**
Poly-pale Ester—Glycerol ester of polymerized rosin. **Hercules Powder Company**
Poly-Solv EE—Lacquer solvent. **Olin-Mathieson**
Poly-Sperse—Plasticizer. **National Polychemicals, Inc.**
Polytergents—Nonionic surface active agents. **Olin Mathieson Chemical Corp.**
Poly-Tex—Polyvinyl acetate copolymer emulsion. **Jones-Dabney Company**
Polytrol—Convertible resins. **McWhorter Chemicals, Inc.**
Polytung—Heat treated tung oil. **Degen Oil, & Chemical Co.**
Pony—Mixer. **The J. H. Day Company.**
Porox—Grinding balls. **Porcelain Div., Ferro Corp.**
Porox—Porcelain grinding media and mill linings—**The Patterson Foundry and Machine Co.**
Potter-Bowser—Electronic meters. **Bowser, Inc.**
Potters—Reflective spheres. **Potters Brothers, Inc.**
Powerox—Power-driven lift trucks. **Barrett-Cravens Co.**
Preventol—Fungicides. **Antara Chemicals Div. of Gen'l Aniline & Film Corp.**
Prgmol—Latex emulsion leveling agent. **Fred'k A. Stresen-Reuter, Inc.**
Primex—Barytes. **DeLore Div., National Lead Co.**
Process-Bowser—Filters. **Bowser, Inc.**
Propocel—Cellulose derivative. **The Dow Chemical Company**
Protatek 53—Sodium alginate thickener. **Croda Inc.**
Protectol—Finishing agents. **General Aniline & Film Corp.**
Protectoseal—Equipment for protection against fires through the use of flammable liquids. **Protectoseal Company**
Protovacs—Cascinates. **The Borden Company**
PT—Pine tar, pine tar oil. **Godfrey L. Cabot, Inc.**
Purecal—Ppt. calcium carbonate. **Wyandotte Chemicals Corp.**
Putrol—Deodorant. **Fritzsche Brothers, Inc.**
PVC 100—Polyvinyl chloride. **The Dow Chemical Company**
PX Plasticizers—Chemical and Resinous Plasticizers. **Pittsburg Coke & Chemical Co.**
Pycal—Chemical Plasticizers. **Atlas Powder Co.**

Pyr[illegible]—Foliated aluminum silicate. **Standard Mineral Corp.**
Pyrax—Aluminum silicate. **R. T. Vanderbilt Co.**
Pyrobel—Fire-proofing agent. **Scher Bros.**
Pyrolux—Maroon pigment. **Sherwin-Williams Co.**

Q

QO—Furan chemicals & derivatives. **The Quaker Oats Company**
Quadrol—Ethylene diamine derivatives. **Wyandotte Chemicals Corp.**
Quinadex—Copper-8 quinolinolate solution. **Nuodex Products Co., Inc.**
Quixept—Alkyd vehicle. **California Ink Co., Inc.**
Quso—Micro fine precipitated silica. **Philadelphia Quartz Co.**
QYNV—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Union Carbide Plastics Co.**

R

R-64—Silicone resin for cold blending. **Silicones Div. Union Carbide Corp.**
R-856—Silicone-alkyd resin. **Dow Corning Corp.**
R-878 Resin—Silicone-alkyd resin. **Dow Corning Corp.**
Radiant Yellow—AAOT benzidine yellow toner. **Ansbacher-Siegle Corp.**
Radox—Control system for lift trucks. **Barrett-Cravens Co.**
Ramapo—Resinated organic pigments. **E. I. du Pont de Nemours & Company, Pigments Dept.**
Rapistan—APC wheel conveyor. **The Rapids Standard Co., Inc.**
R & R—Bodying and surface active agents. **Ross & Rowe, Inc.**
Raven—Carbon black pigment. **Columbian Carbon Company**
Rayox—Titanium dioxide. **R. T. Vanderbilt Co.**
R-B-H—Pigment dispersions. **R-B-H Dispersions**
RC Plasticizer E S—Polymeric plasticizer. **Rubber Corporation of America**
RD 910—Stabilizer-thickner. **Minnesota Mining & Manufacturing Company**
REA—Hydrated aluminum silicate. **Georgia Kaolin Co.**
Readco—Mixers & materials handling equipment. **Read Standard Corporation**
RECO Brown—Concentrated brown iron oxides. **Reichard-Coulston, Inc.**
Red Diamond—Cylinder gas-CO-. **Liquid Carbonic Corp.**
Red Giant—Hand lift truck. **Revolvator Co.**
Redicote—Asphaltic adhesion agents—**Armour Industrial Chemical Co.**
Red Toner (Manganese) R-93—**B.O.N. reds. B. F. Goodrich Chemical Co.**
Regal—Oil furnace carbon blacks. **Cabot Corporation.**
Regal Yellows—Chrome yellow pigment. **Imperial Paper and Color Corp.**
Repello—Water repellent. **Scher Bros.**
Resimene—Butylated melamine formaldehyde resins. **Monsanto Chemical Company, Plastics Div.**
Resimene-U—Butylated urea formaldehyde resins. **Monsanto Chemical Company Plastics Div.**
Resinox P97—Phenolic resin. **Monsanto Chemical Company**
Resipel—Water repellent. **Scher Bros.**
Restco—Strainers, paddles, yardsticks. **Reliable Strainer Mfg. Co.**
Resyn—Polyvinyl acetate emulsions. **National Starch Products, Inc.**
Resoflex—Plasticizers. **Cambridge Industries, Inc.**
Revolvator—Materials handling equipment. **Revolvator Company**
Rex Orange—Molybdate orange. **Imperial Paper & Color Corp.**
Reynolds Metals—Aluminum Powder & Paste. **Reynolds Metals Company**
Reynolized—Aluminum paste pigment. **Reynolds Metals Company**
Rezamul—Alkyd Emulsions. **Reichhold Chemicals, Inc.**
Rezimac—Oil modified alkyds. **McWhorter Chemicals, Inc.**
Rezyl—Oil & resin-modified alkyd resins. **American Cyanamid Company, Plastics & Resins Div.**
Rheotol—Surface active agent. **R. T. Vanderbilt Company**
Rhoplex—Acrylic resin dispersions. **Rohm & Haas Company**
Rhoplex AC-33—Acrylic emulsion. **Rohm & Haas Company**
Rhotex—Emulsified resin. **Rohm & Haas Co.**
Richmond Green Dispersion—Pigment green **Ansbacher-Siegle Corp.**
Roalox—Grinding mill jars. **The U. S. Stoneware Co.**
Ro-Ball—Sifter. **The J. H. Day Company.**
Rocker-Roll—Drum mixers. **The U. S. Stoneware Co.**
Rodine—Pickling acid inhibitors. **Amchem Products Corp.**
Roller Type—Laboratory mills. **The U. S. Stoneware Co.**
Roman—Manganese-BON pigment. **Kentucky Color & Chemical Co.**
Rona-Pearl—Pigment. **Rona Pearl Corp.**
Roskydal—Wax free polyester. **Naftone, Inc.**
Rotator—Drum truck. **Morse Manufacturing Company, Inc.**
Rotoblast — Drum reconditioner. **Pangborn Corp.**
Rotocan—Change-can mixers. **Baker Perkins, Inc.**
Rota-cone—Blender; vacuum drier. **Paul O. Abbe, Inc.**
Royal Spectra—Carbon blacks. **Columbian Carbon Co.**
Rubanox Red—Lithol Rubine. **Sherwin Williams Co.**
Rubine Reds—Organic red pigments. **Imperial Paper & Color Corp.**
Rub-Sol—Rubber solvent. **Anderson Prichard Oil Corporation.**
Rustib—Corrosion inhibitor. **Raybo Chemical Company**
RV—Flatting paste. **R-B-H Dispersions**

S

SAIB—Sucrose diacetate hexaisobutyrate. **Eastman Chemical Products, Inc.**
SMC Whiting—Calcium carbonate. **Tamms Industries Co.**
Safe-T-Hues—Special non-toxic colorants. **H Kohnstamm & Company, Inc.**
Safflower 22—Isomerized safflower oil. **Pacific Vegetable Oil Corp.**
Saflex—Polyvinyl butyral. **Monsanto Chemical Company Plastics Dept.**
Sag—Antifoam agent. **Silicones Div., Union Carbide Corp.**
St. Joe—Lead-free zinc oxide. **St. Joseph Lead Company**
St. Joe Black Label, Red Label, Green Label—Lead free zinc oxides. **St. Joseph Lead Co.**
Santicizer—Chemical plasticizers. **Monsanto Chemical Company**
Santocel—Extender pigment, silica aerogel. **Monsanto Chemical Company**
Santolite—Aryl sulfonamide-formaldehyde resins. **Monsanto Chemical Company**
Santomash—Odor masking agent. **Monsanto Chemical Co.**
Santomerse—Anionic surface active agent. **Monsanto Chemical Co.**
Santonox — Polyolefin anti-oxidant. **Monsanto Chemical Co.**
Sapona Reds—Soapfast reds. **Standard Ultramarine & Color Company**
Saran—Vinylidene Chloride polymers. **The Dow Chemical Company**
Sarkosyls—Emulsifiers and anti-corrosive agents. **Geigy Industrial Chemicals**
Schercolene—Dispersing agent. **Scher Bros.**
Scotch Brand—Talcs. **Southern California Minerals Company**
Sealed-Disc—Paint filters. **Alsop Engineering Corporation**
Seal-Kyd—Alkyd vehicle. **California Ink Co., Inc.**
Seatone—Flushed colors for water emulsion paints. **Hilton-Davis Chemical Co.**
Sequestrene—Metal complexing agent. **Geigy Industrial Chemicals**
Serene—Benzidine yellow. **Sherwin-Williams Co.**
Ser-X—Extender pigment; Sericite (hydrous aluminum silicate). **Innis, Speiden & Co., Inc.**
Shamrock—Hansa yellow. **Sherwin-Williams Co.**
Shannon-Glow—Black light fluorescent products. **Shannon Luminous Materials Co.**
Shannon Line—Black light lamps. **Shannon Luminous Materials Co.**
Shear-flow—Mixers. **Gabb Special Products**
Sheffield—Colors & tints. **Sheffield Bronze Paint Corp.**
Shellmax—Micro crystalline waxes. **Shell Oil Company**
Shell Sol—Stoddard solvent. **Shell Oil Company**
Shell wax—Paraffin waxes. **Shell Oil Company**
Sheroscope—Sodium sulfonate. **Bryton Chemical Co.**
Sher-Will-Glo—Fluorescent colors. **Sherwin-Williams Co.**
Ship Pitch—Pitch. **Newport Industries, Inc., Div. of Heyden-Newport Chemical Co.**
Shirlan—Industrial fungicided. **E. I. duPont de Nemours & Co., Inc.**
Sierra Filbrene—Extender pigment; Talco (magnesium silicate). **Innis, Speiden & Co., Inc.**
Sierra Mistron—Extender pigment; Talc (magnesium silicate). **Innis, Speiden & Co., Inc.**
Sight-O-Matic—Paint mills. **J. M. Lehmann Co., Inc.**
Silastic—Silicone rubber. **Dow Corning Corp.**
Silex—Extender pigment; hard silica. **Innis, Speiden & Company, Inc.**
Silvar—Aluminum pastes & powders. **Siberline Mfg. Company, Inc.**
Silver Bond "B" Silica—Crystalline-hard silica. **Tamms Industries, Inc.**
Silvex—Aluminum pigment. **Siberline Mfg. Company, Inc.**
Sinclair—Solvents. **Sinclair Chemicals Inc.**
Sipon & Sepex—Anconic emulsifiers, fatty alcohol sulfates, and ether sulfates. **American Alcolac Corp.**
Siponic—Nonionic emulsifiers, fatty alcohol ethroxylates. **American Alcolac Corp.**
Siposan—Cationic emulsifiers, fatty alcohol quaternary ammonium salts. **American Alcolac Corp.**
Skelly—Benzene-nitration grade. **Skelly Oil Co.**
Skelly—Toulene-nitration Grade. **Skelly Oil Co.**
Skelly-Xylene- 10 degree range—**Skelly Oil Co.**
Skelly solve—Aliphatic hydrocarbon solvents **Skelly Oil Co.**
Skyline Blue—Phthalocyanine blues. **B. F. Goodrich Chemical Co.**
Smico—Process equipment. **Southwest Mill Industrial Equipment Company**
Smithko—Pigments and extenders. **Smith Chemical & Color Company**
Socal Petrolatum—Waxes. **Standard Oil Co. of California**
Socal Solvent—Aromatic Solvent. **Standard Oil Company of California**
Softex—Blue pigment. **Kentucky Color & Chemical Co.**
Softex Red—Precipitated pure red oxide. **Reichard-Coulston, Inc.**
Solarite—Hydrocarbon resin. **Solar Compounds Corp.**
Solfast—Lightfast organic red, phthalocyanine blue. **Sherwin-Williams Co.**
Solinox—Process linseed oil. **Spencer Kellogg & Sons, Inc.**
Solox—Solvent. **U. S. Industrial Chemicals Co.**
Solros—Heat-treated wood rosin. **Newport Industries, Inc.**
Soltrol—Odorless paint solvents & thinners. **Phillips Petroleum Company**
Solvatone—Solvent. **Union Carbide Chemicals Co.**
Solvenol—Mixer terpene solvent. **Hercules Powder Company**
Solvent #30—Terpene solvent. **Newport Industries, Inc.**
Solvesso—Aromatic petroleum solvents. **Esso Standard Oil Company**
Solvoflex—Gaskets. **The U. S. Stoneware Co.**
S-O-M—Sight-I-Matic control of roll pressures. **L. M. Lehmann Co., Inc.**
Sorapon—Alkyl aryl sulfonates. **General Aniline & Film Corp.**
Sorbo—70% sorbitol solution. **Atlas Powder Co.**
Sovasol—Aliphatic petroleum solvents. **Socony-Vacuum Oil Company**
Soya Paint Oil—Modified soybean oil. **Pacific Vegetable Oil Corp.**
Soya Solinox—Process soybean oil. **Spencer Kellogg & Sons, Inc.**
Soyates—Soybean driers. **The Harshaw Chemical Company**
Soywood Oil—Co-polymerized combination of refined soybean oil and tung oil. **Pacific Vegetable Oil Corp.**
Spacesaver—Cushion tire lift trucks. 3,000 through 10,000 lbs. capacity. **Hyster Co.**
SP Alizarine Maroon MV-7013—Alizarine maroons. **B. F. Goodrich Chemical Co.**
Spallbar—Water repellent. **Silicones Div., Union Carbide Corp.**
Span—Emulsifiers; fatty acid esters of sorbito anhydrides. **Atlas Powder Company**
Spangle—Aluminum paint improver. **Raybo Chemical Company**
Sparkler—Horizontal plate filters. **Sparkler Mfg. Co.**
Sparmite—Very fine barium sulfate. **C. K. Williams & Company**
Sparsol—Vinyl type polymer. **Sparta Industries**
SP Blue Toners BT-8—Tungstated blues and violet. **B. F. Goodrich Chemical Co.**
Specimen—Grinding jar. **Paul O. Abbe, Inc.**
Spectronic 20—Colorimeter. **Bausch & Lomb Optical Company**
Speedy-Pak—Fibre drum. **Bennett Industries, Inc.**
Speedee Mite—"Miniature paint factory in a test tube." **Charles E. Baker Company**
Spenco—Handling Machines, can unscramblers, box set up machines, gluing and closing machines. **Phillips Assoc.**
Spenco Jet Age—Mixers, agitators, dissolvers. **Phillips Assoc.**
Spenkel—Polyurethane. **Spencer Kellogg & Sons Inc.**
Spheron—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Sprayon—Line of aerosols. **Sprayon Products, Inc.**
SR—Silicone resins. **General Electric Co.**
Stabelan—Vinyl stabilizers. **Harwick Standard Chemical Company**
Staley's—Soybean oils. **A. E. Staley Mfg. Co.**
Staybelite Ester—Glycerol ester of hydrogenated rosin. **Hercules Powder Company**
Stabilizer D-22—Dibutyl tin dilaurate. **Union Carbide Chemicals Company**
Stamford—Aluminum pastes & powders. **Siberline Mfg. Company, Inc.**
Standard—Zinc dust. **New Jersey Zinc Co.**
Standard Refined Wax—Waxes. **Standard Oil Company of California**
Standard Thinner—Aliphatic thinners. **Standard Oil Company of California**

Standardaire—Blower. **Read Standard Corp.**
Stardust—Magnesium silicate. **Tamms Industries, Inc.**
Starwax—Additives. **Bareco Wax Co. Div. of Petrolite Corp.**
Sta-Sol—Soybean lecithin concentrate. **A. E. Staley Mfg. Co.**
Statex—Carbon black pigment. **Columbian Carbon Company**
Stayco—Oxidized corn starch. **A. E. Staley Mfg. Co.**
Stayrites—Vinyl stabilizer. **Witco Chemical Co.**
Stearite—Dispensing agent. **Witco Chemical Co.**
Steelco—Distilled tall oils. **K. A. Steel Chemicals, Inc.**
Sterling—Oil and gas furnace and gas thermal carbon blacks. **Godfrey L. Cabot, Inc.**
Stern-Tite—Paint cans. **Stern Can Co., Inc.**
Sterox—Nonionic surface active agents. **Monsanto Chemical Co.**
Steveco—Mixers, grinding equipment, tanks, fans, blowers. **The Stevenson Company**
Straddle—Trucks. **Hyster Co.**
Streako—Metallic Soaps. **W. H. Fales Co.**
Strypp-Away—Liquid paint stripper. **The DuBois Company, Inc.**
Stycast—Polystyrene casting resins. **Emerson & Cuming, Inc.**
Stypol—Polyester resins. **Freeman Chemical Corp.**
Styresol—Styrenated alkyd resins. **Reichhold Chemicals, Inc.**
Styretex—Styrenated alkyd resins. **Jones-Dabney Company**
Styron—Polystyrene. **The Dow Chemical Co.**
Sulframin—Wetting applications. **Witco Chemicals Co.**
Sunaptic—Naphthenic acids. **Sun Oil Co.**
Sunoco—Solvents. **Sun Oil Co.**
Sunolite—Anti-sunchecking wax. **Witco Chemical Co.**
Sunolith—Lithopone. **The Glidden Company**
Sun Yellow—Pigment. **The Harshaw Chemical Co.**
Super Ad-It—Fungicide. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Super Aetna Crimson Red Oxide—Produced from crude Persian Gulf red oxide. **Reichard-Coulston, Inc.**
Supercarbovar—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Super Cobalt—Catalyst. **Naftone, Inc.**
Super Ester Gum—Pentaerythritol ester of rosin. **Crosby Chemicals, Inc.**
Super Fine—Aluminum pigments. **Siberline Mfg. Co., Inc.**
Superjet—Lampblack—**C. K. Williams & Co.**
Super Lacros—Maleic modified rosin esters (glycerol-type). **Crosby Chemicals, Inc.**
Superlith—Zinc sulphide and lithopone pigments **C. J. Osborne Co.**
Superloid—Granular high viscosity ammonium alginate. **Kelco Co.**
Superloid—Thickiners. **Kelco Co.**
Super-Multifex—Precipitated calcium carbonate **Diamond Alkali Co.**
Super Spectra—Carbon black pigment. **Columbian Carbon Company**
Super Three—Roller mills. **Kent Machine Works, Inc.**
Superba—Carbon black pigment. **Columbian Carbon Company**
Super-Beckacite—Pure phenolic resins. **Reichhold Chemicals, Inc.**
Super-Beckamine—Melamine-formaldehyde Resins. **Reichhold Chemicals, Inc.**
Super-Beckosol—Isophthalic Acid Alkyd Resins **Reichhold Chemicals, Inc.**
Super IMperse—Aqueous pigment dispersions. **Imperial Paper & Color Corp.**
Super carbovar—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Superflo—Linseed grinding oils. **Spencer Kellogg & Sons, Inc.**
Superfyde—Formaldehyde polymer. **Heyden Newport Chemical Corporation**
Superior—Linseed varnish oils. **Spencer Kellogg & Sons, Inc.**
Superior—Soybean varnish oils. **Spencer Kellogg & Sons, Inc.**
Superjet—Lampblack. **C. K. Williams & Co.**
Super-sol—odorless naphtha. **Pennsylvania Refinishing Company**
Supramine—Dye assistants. **General Aniline & Film Corp.**
Supreme—Crushers, pulverizers. **Franklin P. Miller & Son, Inc.**
Suprex—Kaolin. **J. M. Huber Corp.**
Surfactol—Surfactant. **Baker Castor Oil Co.**
Surfex—Calcium carbonate extender pigments. **Diamond Alkali Company**
Surfex MM—Resin coated calcium carbonate. **Diamond Alkali Co.**
Surfynol—Surface active agent, dispersant, liquid defoamer. **Air Reduction Chemical Co.**
Suspenso—Calcium carbonate extender pigments. **Diamond Alkali Company**
Syloid—Flatting thickening and gelling agents. **W. R. Grace & Co., Davison Chemical Civ.**
Synasol—Solvent. **Union Carbide Chemicals Co.**
Suspenso—Precipitated calcium carbonate. **Diamond Alkali Co.**
Susperse—Anti-sagging, anti-settling, wetting and dispersing agent. **Raybo Chemical Co.**
Swiveloader—Material handling equipment. **Stephens-Adamson Mfg. Company**
Syloid—Extender pigments; silica. **Davison Chemical Company**
Syl-Kem—Silicone intermediate. **Dow Corning Corp.**
Sylkyd—Reactive silicone intermediate. **Dow Corning Corp.**
Sylvan Green—Chrome green pigments. **Imperial Color Chemical & Paper Corp.**
SynPar—Hard, high-melting wax. **H. L. Barnebey**
Syntex—Alkyd resins. **Jones-Dabney Company**
Synthaline Blue—Pure phthalo toner. **Whittaker, Clark & Daniels, Inc.**
Synthe-Copal—Ester gum resins. **Reichhold Chemicals, Inc.**
Synthemul—Alkyd emulsion. **Reichhold Chemicals, Inc.**
Synthenol—Dehydrated castor oil. **Spencer Kellogg & Sons, Inc.**
Syn-U-Tex—Butylated urea formaldehyde resins. **Jones-Dabney Company**
Synvarite—100% phenolic resins. **Synvar Corp.**
Synvarol—Butylated urea resins. **Synvar Corp.**

T

T 1215—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**
T24-9—Vinyl alcohol-acetate resin. **Union Carbide Plastics Co.**
Tallene—Tall oil pitch. **West Virginia Pumfi & Paper Co.**
Tamol—Dispersing agents. **Rohm & Haas Co.**
Tasco—Talc. **Tamms Industries, Inc.**
T.A.T. Bentonite—Colloidal clay. **Tamms Industries, Inc.**
TBTO—Agcides, fungicides, mildewcides. **Metal & Thermit Corp.**
T.C.—Calcium carbonates. **Tamms Industries, Inc.**
Tecquinol—Technical hydroquinone. **Eastman Chemical Products, Inc.**
Tecsol—Proprietary solvent based on ethyl alcohol. **Eastman Chemical Products, Inc.**
Tenex—Heat-treated wood rosin. **Newport Industries**
Tenlo 70—Pigment grinding aid. **Nopco Chemical Company**
Tenn-Plas—Benzoicacids. **Tennessee Products & Chemical Corp.**
Tenn-Sil—Fillers. **Tennessee Products &**
Tenox — Antioxidants. **Eastman Chemical Products, Inc. Chemical Corp.**
Tergitol—Nonionic and anionic surface active agents. **Union Carbide Chemical Company**
Tetronic—Nonionic wetting agent and dispersant. **Wyandotte Chemicals Corp.**
Texaphor — Anti-setting agent. **Dehydag Deutsche Hydrierwerke GMBH**
Texapon—Stabilizer and suspension agent. **Dehydag Deutsche Hydrierwerke GMBH**
Texas—Pigment blacks. **Sid Richardson Carbon Co.**
Textile Spirits—An aliphatic naphtha having an evaporation range similar to benzol. **American Mineral Spirits Company**
Texturized—Dispersible dry pigments. **Mineral Pigments Corp.**
T-Glo-8 & 8Y—Tall oil gloss oil. **Newport Industries**
Thermatomic Black—Low oil adsorption black. **R. T. Vanderbilt Co.**
Thermax, P-33—Carbon blacks. **R. T. Vanderbilt Company**
Thermoguard—Antimony-base flame retarders. **Metal & Thermit Corp.**
Thermoil-Granodine—Manganese ironphosphate coating chemicals for wear-proofing and rust-proofing. **Amchem Products, Inc.**
Thermolite—Stabilizers for vinyls. **Metal & Thermit Corporation**
THFA—Tetrahydrofurfuryl alcohol. **The Quaker Oats Company**
Thixin—Multi-purpose paint additive. **Baker Castor Oil Co.**
Thoro-Blender—Conical dry blender & mixer. **Patterson Foundry & Machine Company**
Ti-Cal—Titanium calcium pigments. **E. I. du Pont de Nemours & Company, Pigments Dept.**
Tipen—Isophthalic tall oil alkyd. **Farac Oil & Chem. Co.**
Tints-All—Universal tinting colors. **Sheffield Bronze Paint Corp.**
Ti-Pure—Titanium dioxide pigments, rutile and anatase. **E. I. du Pont de Nemours & Co. Pigments Dept.**
Titanolith—Titanated lithopone. **The Glidden Company**
Titanox—Titanium dioxide pigments; rutile, anatase, non-pigmentary, titanium calcium. **Titanium Pigment Corporation**
TK—Flatting paste. **R-B-H Dispersions**
TMC—Cylinders and spheres for aerosol products. Receivers for refrigeration. **Tube Manifold Corp.**
TME — Trimethylolethane. **Heyden-Newport Chemical Corporation**
TMP — Trimethylolpropane. **Heyden-Newport Chemical Corporation**
Tolbe—Tall oil pitch. **Newport Industries, Div. of Heyden-Newport Chemical Corp.**
Tolusol—Lacquer diluent. **Shell Oil Company**
Townmotor—Forklift trucks. **Townmotor Corp.**
Toxilic—Maleic acid. **National Aniline Division Allied Chem. Corp.**
Toximul 250—Emulsifier. **Ninol Laboratories**
Transphalt—Asphaltic hydrocarbon resin. **Pennsylvania Industrial Chemical Corporation**
Transveyor—Compact, low-cost stacker. **Automatic Transportation Company**
Trident—Positive displacement meter. **Neptune Meter Co.**
Troykyd—Fungicides, puffing & bodying agents, anti-floating agents, anti-sagging agents, anti-settling agents, santi-skinning agents, wetting agents, dispersing agents. **Troy Chemical Co.**
Triangel—Carbon black. **United Carbon Co., Inc.**
Tribase—Stabilizers for vinyls. **National Lead Company**
Triclene—Trichlorethylene. **E. I. du Pont de Nemours & Company, Inc., Electrochemicals Dept.**
Tri-Homo—Homogenizing machinery. **Tri-Homo Corporation**
Trimet—Trimethylolethane. **Trojan Powder Co.**
Tripentek—Tripentaerythritol technical. **Heyden Newport Chemical Corporation**
Triple Action—High speed colloid mills. **Troy Engine & Machine Co.**
Triton—Surface active agents. **Rohm & Haas Company**
Trojan—Chemicals & explosives. **Trojan Powder Co.**
Troluoil—Aliphatic petroleum thinner. **Anderson-Prichard Corporation**
Troykyd—Driers. **Troy Chemical Co.**
Troysan—Mildewcide. **Troy Chemical Co.**
Troyolin—Driers. **Troy Chemical Co.**
Tulip—Tone colors. **Holland Color & Chemical Co.**
Turbo—Centrifugal sifters. **Abbé Engineering Co.**
Tween—Emulsifiers; polyoxyethylene sorbitan fatty acid esters. **Atlas Powder Company**
Twitchell—Emulsifying agents. **Emery Industries, Inc.**
Ty-Bond—Zinc phosphate coating for metal. **Cowles Chemical Company**
Typhoon Agitator—Portable liquid mixer. **Patterson Foundary & Machine Company**
Ty-Ply—Adhesive. **Marbon Chemical**

U

Ucon—Product trade name. **Union Carbide Chemicals Co., Div. Union Carbide Corp.**
Ubatol—Modified polystyrene emulsion. **U B S Chemical Co., Inc.**
Uformite—Urea formaldehyde and melamine-formaldehyde resins. **Rohm & Haas Company**
Ultraflex—Additives. **Bareco Wax Co., Div. of Petrolite Corp.**
Ultrapole S—Amine condensate. **Ultra Chemical Works, Inc.**
Ultrapole—Detergent. **Witco Chemical Co.**
Ultra-Turrax—Colloid Mills. **Cartrite International, Inc.**
Unapex—Latex paint base. **Naftone, Inc.**
Uneek—Universal vehicle. **Farnow, Inc.**
Unimixers—Vertical liquid mixer. **Patterson Foundry & Machine Company**
Unipower—Agitator-mixer drive. **Patterson Foundry & Machine Company, Div. of Ferro Corp.**
Unitane—Titanium dioxide pigment. **American Cyanamid Co. Pigments Div.**
Unitol—Refined Tall Oil. **Union Bag & Paper Corporation**
Uplifter—Portable elevator. **Revolvator Co.**
Urac—Bonding resin. **American Cyanamid Co.**
U.S.I. Isosebacic Acid—Mixture of isomers of sebacic acid. **U. S. Industrial Chemicals Co.**
USS—Aromatic hydrocarbon solvents. **United States Steel Corporation**
USCO Resin—Oil-modified alkyd. **U. S. Coatings Co.**
USSCO—Ball mills. **The U. S. Stoneware Co.**
UTC—Tinting colors. **California Ink Co., Inc.**
Utiltank—Glass lined storage tanks. **The Pfaudler Company**
Uversol—Driers. **The Harshaw Chemical Company**
Uvinul—Ultraviolet absorbers. **Antara Chemicals, Div. of Gen'l Aniline & Film Corp.**

V

Vac-Dry—Bleached shellac gun. **William Zinsser & Co., Inc.**
VAGH—Vinylchloride-acetate resins. **Union Carbide Plastics Co.**
Vale Green—Chrome green pigment. **Imperial Paper & Color Corp.**
Vancide—Fungicides. **R. T. Vanderbilt Co.**
Vandor—Paint deodorant. **van Ameringen-Haebler, Inc.**

Viscorder—Viscosimeter. **C. W. Brabender Instruments**
Viscotrel—A—Thixotropic agent. **Ferro Chemical Corp.**
Viscoyate—Bodied oil. **California Ink Co., Inc.**
Vistac—Rubber plasticizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Vistex 111—Rubber gaskets. **American Felt Co.**
Vitel—Polyester coating resins. **Goodyear Tire & Rubber Co. Chemical Div.**
Viton—Synthetic rubber. **E. I. DuPont de Nemours & Co.**
VMCH—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**
Voldox—Tertiary butylated phenol. **Guardian Chemical Corporation**
Vulcan—Oil furnace carbon black. **Godfrey L. Cabot, Inc.**
Vulcan—Steel shipping containers. **Vulcan Containers, Inc.**
VVF Pigments—Very fine natural iron oxides. **C. K. Williams & Company**
VYCM-1-2—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Union Carbide Plastics Co.**
VYCM-3—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**
Vygen—Polyvinyl chloride resin. **The General Tire & Rubber Company**
VYHH—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**
VYLF—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**
Vynite—Collapsible tubes for paint pigments. **Continental Can Company, Inc.**
VYNS—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**
VYNV-1-2—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Union Carbide Plastics Co.**
VYNW-5—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

W

Wallkyd—Alkyd resin vehicles. **Reichhold Chemicals, Inc.**
Wallpoll—Plasticized vinyl acetate emulsion. **Reichhold Chemicals Inc.**
Watchung—Permanent red 2B pigments. **E. I. du Pont de Nemours & Company**
WC-130—Polyvinyl acetate emulsion. **Union Carbide Plastics Co.**
Weather-Ometer—Accelerated Weathering Machines. **Atlas Electric Devices Company**
Wetall—Wetting agent. **Scher Bros.**
Wet-Ege Spirits—Aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corporation**
Wemco—Torque flow solids pump. **Western Machinery Company**
Windsor—Non-woven bonded filter fabrics. **American Felt Co.**
Witall—Tall oil driers. **Witco Chemical Co.**
Witcarb—Precipitated calcium carbonate. **Witco Chemical Company**
Witclzers—Plasticizers. **Witco Chemical Co.**
Witco—Paint driers, surface active agents, & stearates. **Witco Chemical Company**
Witcoblak—Furnace or channel blacks. **Witco Chemical Company**
Wittox—Copper & Zinc naphthenates. **Witco Chemical Company**
Wonex—Soda-treated wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**

X YZ

X Universal Colorants—Tinting colors. **California Ink Co., Inc.**
XR-859, XR-875 Resins—Silicone phenolic resins. **Dow Corning Corporation**
XX—Lead-free zinc oxide. **New Jersey Zinc Co.**
XYHL, XYSG—Vinyl butyral resins. **Union Carbide Plastics Co.**
Xlor Barytes—White barytes. **DeLore Div. National Lead Co.**
X-2280—Anti-floating agent. **Imperial Color Chemical & Paper Corp.**
X-2600—Benzidine Yellow. **Imperial Color Chemical & Paper Corp.**
Yelkin—Lecithin. **Ross & Rowe, Inc.**
Zeco—Asphalts, stearine pitches, gilsonite. **G. S. Ziegler & Company**
Zeolex—Ultra fine silico aluminate. **J. M. Huber Corp.**
Zinar—Zinc resinate. **Newport Industries**
Zinol—Zinc resinate. **Newport Industries**
Zircatalox—Driers. **Ferro Chemical Division.**
Zirco—Drier catalyst. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Zirex—Zinc resinate. **Newport Industries**
Zitro—Zinc resinate. **Newport Industries**
Zopaque—Titanium dioxide. **The Glidden Company**
Zulu—Phthalocyanine blue & green pigments. **Kentucky Color and Chemical Company**
Zytel—Nylon resin. **E. I. duPont de Nemours & Co., Inc.**
ZZZ—Lead free zinc oxides. **American Zinc Sales Co.**

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1 MELAQUA® 600

Resin is a completely water-soluble, heat-convertible vehicle for the formulation of industrial baking enamels. The cured resin film, an acrylic polymer cross linked with melamine resin, embodies many of the favorable characteristics of both these resin types. MELAQUA 600 Resin enamels are actually superior in many respects to the highest quality melamine resin-non-oxidizing alkyd formulations. Add only pigment and water to the vehicle to produce an enamel that excludes the need for inflammable solvents.

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Alkyd Emulsion—*stable* water emulsion gives complete control of flatness for interior wall paints. It does not tend to skin in processing or storage, is easily cleaned up with water since it does not form irreversible gel until oxidized. CYAQUA contains no external plasticizers, casein or protein. Paints brush out easily, dry rapidly, show negligible foaming. Excellent adhesion to flat or glossy surfaces.

3 CYCOPOL®

Copolymer Resins—for air-drying and baking finishes with unsurpassed drying speed up to the speed of lacquer. Good durability with excellent water and chemical resistance, color and color retention, hardness and gloss. Six types of CYCOPOL resins lend themselves to such diverse applications as paper and polystyrene coatings, industrial, automotive refinishing and implement enamels, a vehicle for "hammered" metallic finishes.

4 CYZAC*

Coating Resins—combine exceptional hardness, mar-resistance and flexibility with outstanding chemical resistance for interior or exterior baking enamels for decorative and industrial use. Also impart high gloss and gloss retention, fast cure, good enamel stability and exterior durability.

5 CYMEL®

Alkylated melamine-formaldehyde resins—for exceptional durability in outdoor, indoor, industrial or decorative finishes. They impart superior gloss, heat and light stability, surface hardness, color retention, mar, solvent, chemical and water resistance. Choose from four outstanding CYMEL resins for coating formulations that may be further varied for fast cure, color retention at high temperatures, very mild odor in exterior baking enamels.

6 BEETLE®

Alkylated urea-formaldehyde resins—impart hardness and high chemical and mar resistance in baking finishes for interior use. Five exceptionally versatile resins are available, offering excellent control of cure, stability, color and color retention, toughness and adhesion in baking finishes for a multitude of interior applications.

7 REZYL®

Alkyd resins—a broad selection for use alone or in combination with Cymel or Beetle resins for improved coating characteristics. REZYL resins are available for flexible nitrocellulose lacquers for paper, leather and textiles; to improve cold-check resistance, rubbing properties, clarity, build, fullness and adhesion in nitrocellulose furniture lacquers; REZYL resins can be used to increase adhesion, gloss and durability of nitrocellulose exterior metal lacquers. Other REZYL resins are available for formulating flat wall finishes with excellent brushing properties, leveling, scrub resistance, color retention, and freedom from flashing or ghosting. Use REZYL in architectural semi-gloss white and colored enamel with fast dry and color retention.

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